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Flying Operations

C-130H OPERATIONS PROCEDURES

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This manual implements Air Force Policy Directive (AFPD) 11-2, *Aircrew Operations.* It establishes guidance for the operation of the C-130H aircraft to safely and successfully accomplish worldwide mobility missions. This is a specialized publication intended for use by Airmen who have graduated from technical training related to this publication. It is used in conjunction with Air Force Manual (AFMAN) 11-202, Volume 3, *Flight Operations*, the appropriate Major Air Command (MAJCOM) supplement, and Air Force Tactics Techniques and Procedures (AFTTP) 3-3.C-130H. This manual applies to all civilian employees and uniformed members of the Regular Air Force, Air Force Reserve and Air National Guard who operate or maintain C-130H aircraft. This manual does not apply to the United States Space Force. This manual requires the collection and or maintenance of information protected by the Privacy Act of 1974 authorized by 37 U.S.C. 301a, Incentive Pay: Public Law (P.L.) 92-204; P.L. 93-570; P.L. 93-294) Aviation Career Incentive Act of 1974 ("ACIA of 1974"), P.L. 93-294, and the Aviation Career Improvement Act of 1989 ("ACIA of 1989") (in P.L. 101-189), and the National Defense Authorization Acts (NDAA) of Fiscal Year (FY) 96 (P.L. 104-106), FY 99 (P.L. 105- 261) and FY 00 (P.L. 160-65). The applicable SORNs are Military Personnel Records System (F036 AF PC C) (Authority: 10 USC 8013), Secretary of the Air Force: Powers and duties; delegation by; Personnel Data System (MILPDS)(F036 AF PC Q) (Authority: 10 U.S.C., various sections); and Aviation Resource Management System of Records Notice (ARMS) (F011 AF XO A) are available at: **http://dpclo.defense.gov/Privacy/SORNs.aspx**. Ensure all records generated as a result of processes prescribed in this publication adhere to Air Force Instruction 33-322, *Records Management and Information Governance Program*, and are disposed in accordance with the Air

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SUMMARY OF CHANGES

This publication has been substantially revised and needs to be completely reviewed. Major changes include Mobilitity Pilot Development (MPD) Phase I takeoff and landing guidance. Added Automatic Dependent Surveillance-Broadcast (ADS-B) guidance. Clarified element lead duties in a multiple element formation. Added unprepared surface takeoff and landing recommendations. Added guidance requiring the use of airport diagram or airfield depiction during taxi operations. Simplified reduced power operations guidance. Visual Flight Rules (VFR) tactical approaches now allow for 60 degrees angle of bank. Updated formation ballistic wind guidance. Updated unaided night visual formation requirements. Additional publication changes, Changed all AFI11-2C-130HV1 and AFI11-231 references to AFMAN. Changed all AFI 33-360 references to DAFI 33-360. Deleted all AFMAN 11-217 references and replaced with AFMAN 11-202V3. Changed all AFI13-217 references to DAFMAN. **Chapter 2, Table 2.1** (note 7). Only one LM required for single LCLA unilaterally using ramp/single bundle drift back procedures; **2.2.4.1.2** Changed to only allow element lead duties in a multiple element formation; **2.2.4.3.1**, **2.2.4.3.2** Clarified IP supervision requirement. -**Chapter 3,** All GTC, APU and APN-59 Radar requirements were removed from tables. **Table 3.13** (TCAS). Updated remarks/limitations/exceptions; **Table 3.13** Added ADS-B guidance; **3.11** Autopilot pitch axis requirements were replaced with altitude hold requirements. Chapter **4**, **4.2.1.1** Removed Exception allowing MPD trained pilots to takeoff/land during emergencies with direct IP supervision; **4.2.3.1** Updated MPD Phase I takeoff/landing guidance; **4.6.1** Added aircraft lighting guidance; **4.8.4**, **4.8.4.1** Added unprepared surface recommendations; **4.9.3.1** Added airport diagram requirement; **4.9.4.4** Added reverse taxi to combat offload exception; **4.13.1** Added additional RAD ALT illumination guidance for maneuvering airplane; **4.15** Simplified reduced power operations guidance. **Chapter 5,** Deleted variable visibility/ceiling reports guidance. Information now in AFMAN 11-202V3_AMCSUP. Formerly **5.20.3.4**; **5.6** Changed to allow electronic forms in mission kits; **5.20.5.1.1** Updated ILS PRM communications requirement; Chapter **7**, **7.1.3** Added exception for carrying passengers while airdropping during exercises. Added Tier waiver; **7.3.2.3** Clarified throttle setting for simulated engine failure on T-56-15A engines. Chapter **8, 8.2.1.4** Changed to allow any MAJCOM approved mission planning system. Deleted True Airspeed Check Procedure. Formerly **8.9**. **Chapter 9,** Removed all GTC/ATM

references; **9.8.1** Added eTOLD option for Pilot Information Card; **9.9.2** Removed mandate for the FE to complete AF Form 4108. **Chapter 10,** Removed requirement for weight and balance supplemental handbook to include T.O. 1C-130E-5 and AFMAN 11-2C-130HV3; **10.2** Added "Responsibilities for Aircraft Loading" guidance; **10.3** Added "Emergency Exits and Safety Aisles" guidance; **10.4** Added "Pre-Mission Duties" guidance; **10.5** Added "Enroute and PostFlight Duties" guidance; **10.6**. Added "Loaded Weapons" guidance. Chapter **11, 11.4.3.1** Depressurization fuel removed comparing to Alternate Fuel, now only compares to Reserve; **Figure 11.1** Removed Alternate Fuel from depressurization fuel calculation; **11.5.2** Deleted CFPS Fuel Planning instructions. Redundant information. Renumbered. Chapter **12, 12.3.2.1** Changed multiple points of impact guidance; **12.3.2.1.1** Added MPI guidance during training; **12.4.9** Changed. SKE contracts are no longer mandatory, just recommended. **Chapter 13** (**Chapter 13** was substantially revised and must be reviewed in its entirety); **13.2** Added "Passengers on Tactical Flights" guidance; **13.6** Added Emergency Airlift planning information; **13.7.4.1** Removed requirement for navigator to call altitude alerts every 100'on final. Removed requirement for navigator to call 50' on departure; **13.8.1** Updated. AOB will not exceed 45 degrees at night or when flaps are extended. 60 degrees is permitted otherwise. Deleted **section 13B** (enroute navigation), 13C (objective area), 13D (approaches), 13F (Departures). Information was repetitive and is available in AFTTP 3-3.C-130H. **Chapter 14,** Deleted TFM min line breast spacing of 6,000feet. Now Mission Commander discretion; **14.7.2.2** Updated unaided night visual formation requirements; **14.9.3.3** Added data link for TFM restrictions; **14.17.3.1** Changed. Crews should now verify two OAPs during the run-in, and one OAP active from the 1-minute advisory through the escape point; **14.17.4.2** Updated formation ballistic wind guidance. Chapter **15, 15.8.2** Added flight examiner restraint harness exception; **15.10** Clarifies that DAFMAN 13-217 wind limit tables will take precedence; **15.22.5** Added WARNING about lowering paratroop doors onto jump platforms; **15.25.1**. Added CAADS capability.

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Chapter 1

GENERAL INFORMATION

1.1. General.

1.1.1. This manual provides guidance for operating the C-130H and LC-130H. It is an original source document for many areas, but for efficiency reaffirms information found in aircraft flight manuals, flight information publications (FLIP), and other Air Force directives. When guidance in this manual conflicts with another basic/source document, that document takes precedence. For matters where this manual is the source document, waiver authority is in accordance with **paragraph 1.3** For matters where this manual repeats information in another document, follow waiver authority outlined in the basic/source document.

1.1.2. Unit commanders and agency directors involved with or supporting C-130H and LC-130H operations shall make current copies (electronic or hardcopy) of this manual available to appropriate personnel. (T-3) Transportation and base operations passenger manifesting agencies should maintain a current copy of this manual.

1.2. Key Words Explained.

1.2.1. "Will", "Shall" or “Must” indicate a mandatory requirement.

1.2.2. "Should" indicates a preferred, but not mandatory, method of accomplishment.

1.2.3. "May" indicates an acceptable or suggested means of accomplishment.

1.2.4. "**Note**" indicates operating procedures, techniques, etc., considered essential to emphasize.

1.2.5. **“CAUTION”** indicates operating procedures, techniques, etc., which could result in damage to equipment if not carefully followed.

1.2.6. **“WARNING”** indicates operating procedures, techniques, etc., which could result in personal injury or loss of life if not carefully followed.

1.3. Deviations and Waivers. Do not deviate from policies in this manual except when the situation demands immediate action to ensure safety. The pilot in command (PIC) is vested with ultimate mission authority and is responsible for each course-of-action taken.

1.3.1. Deviations. The PIC shall report deviations or exceptions taken without a waiver through command channels to the Chief, MAJCOM Stan/Eval who in-turn shall notify the Chief, AMC Stan/Eval (lead command), as appropriate, for follow-on action. **(T-2)**

1.3.2. Waivers. The authorities to waive wing/unit level requirements in this publication are identified with a Tier (“T-0, T-1, T-2, T-3”) number following the compliance statements. See DAFI 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the requestors commander for non-tiered compliance items.

1.3.3. Waivers affecting theater unique circumstances without an expiration date must be approved by, or coordinated through, the MAJCOM/A3. **(T-2)**

1.3.4. Long-term waivers with specific expiration dates affecting multiple aircraft or missions must be approved by the applicable MAJCOM/A3 and sent from the appropriate MAJCOM Stan/Eval to AMC Stan/Eval. **(T-2)**

1.4. Supplemental Procedures. This manual is a basic directive. Each user MAJCOM or operational theater may supplement this manual according to Air Force Policy Directive (AFPD) 11-2, and DAFI 33-360. MAJCOMs stipulate unique procedures (cannot be less restrictive than this basic document) and publish MAJCOM Directorate of Operations (MAJCOM/A3) approved permanent waivers in the MAJCOM supplement.

1.4.1. Combined Command Operations. Plan and conduct all operations that include forces from multiple MAJCOMs using provisions in this manual. Do not assume or expect aircrews to perform MAJCOM theater unique procedures without owning MAJCOM/A3 approval and advance training.

1.4.2. Coordination Process. Forward MAJCOM-proposed supplements (attach AF Form 673, *Request to Issue Publication*) to Air Mobility Command/Standards and Evaluations Division (AMC/A3V) for mandatory coordination prior to approval.

1.5. Local Supplement Coordination Process. Operations Group commanders (OG/CCs) may define operating procedures to this manual in a unit supplement or locally generated guidance. OG/CCs must obtain approval from MAJCOM prior to releasing their supplement or Operating guidance. **(T-2)** Send an electronic copy of the approved version to MAJCOM/A3V. MAJCOM/A3V will send approved copies to Air Mobility Command/Standards and Evaluation Division (AMC/A3V).

1.6. Definitions. Find explanations or definitions of terms and abbreviations commonly used in the aviation community in CFR Title 14, **Part 1**; Department of Defense (DoD) FLIP, *General Planning*, **Chapter 2**; and Joint Publication 1-02, *DoD Dictionary of Military and Associated Terms*. See **Attachment 1** for common terms used in this manual.

1.7. Roles and Responsibilities.

1.7.1. Major Command Operations Directorate (MAJCOM/A3). MAJCOMs will provide guidance and approve waivers (as required), where specified throughout this manual. **(T-1)**

1.7.2. Pilot in Command (PIC). The PIC is the aircrew member designated by competent authority, regardless of rank, as being responsible for, and is the final authority for the operation of the aircraft. The PIC will ensure the aircraft is not operated in a careless, reckless, or irresponsible manner that could endanger life or property. **(T-3)** The PIC will ensure compliance with this manual and the following: **(T-3)**

1.7.2.1. HAF, MAJCOM, and Mission Design Series (MDS)-specific guidance.

1.7.2.2. Flight Information Publications (FLIP) and Foreign Clearance Guide (FCG).

1.7.2.3. Air Traffic Control (ATC) clearances.

1.7.2.4. Notices to Airmen (NOTAMs).

1.7.2.5. Aircraft Technical Orders (T.O.).

1.7.2.6. Combatant Commander's instructions and other associated directives.

1.7.3. Aircrew. Individuals designated on the flight authorization (FA) are responsible to fulfill specific aeronautical tasks regarding operating USAF aircraft as specified in this AFMAN or by other competent, supplemental authority.

1.8. Aircrew Operational Reports. The reporting requirements in this manual are exempt from licensing in accordance with AFI 33-324, *The Air Force Information Collections and Reports Management Program.*

Chapter 2

AIRCREW COMPLEMENT/MANAGEMENT

2.1. General. This chapter provides guiding principles to form/manage mobility aircrews. This guidance assists commanders at all levels to form aircrews and to develop aircrew-related work and rest schedules. Correct utilization of aircrews optimizes efficiency of mobility forces engaged in worldwide operations.

2.2. Aircrew Complement. Squadron Commanders **(**SQ/CCs) shall form aircrews based on the fragmentation order (FRAG)/mission directive, crew duty time (CDT) and flight duty period (FDP) requirements, aircrew member qualifications, and other constraints to safely accomplish the mission tasking. **(T-3)** **Table 2.1** below summarizes crew position requirements for different crew types. **Exception:** Crew complement for specialized missions (e.g., Aerial spray, ski, and modular airborne fire fighting system (MAFFS)) is addressed in the addendum covering those missions.

2.2.1. The minimum aircrew member complement for a local training flight is an Aircraft Commander (AC), Mobility Pilot Development (MPD) pilot, Flight Engineer (FE), and Loadmaster (LM). **(T-1)** When a mission requires more than one aircrew member at a position, the SQ/CC may determine whether an instructor and non-mission ready (NMR) crewmember meet mission requirements.

2.2.2. SQ/CCs shall form augmented aircrews for missions planned to take longer than a basic CDT. Augmenting aircrew members must be current, qualified, and mission ready (MR) in accordance with AFMAN 11-2C-130HV1, *C-130H Aircrew Training*. **(T-3) Exception:** A crewmember who is NMR may augment provided the event(s) they are NMR in will not be performed on that flight. **(T-2)** SQ/CC shall augment an aircrew for the full FDP. **(T-3)** (See AFMAN 11-202V3_AMCSUP, *Flight Operations*, for more on CDT/FDP).

Table 2.1. Aircrew Complement.

Crew Position	Crew Complement		
	Basic	**Augmented**	**Tactical**
Aircraft Commander (AC)	1	2 (1)	1
MPD Pilot	1	1	1
Navigator	1 (2)	2	1 (2)
Flight Engineer	1	2	1
Loadmaster	1 (3)(4)(7)	2	1/2 (5)(6)(7)

Notes:

(1) The PIC maintains ultimate responsibility of overall conduct of the mission. Transfer of PIC duties between qualified ACs will be briefed to the crew. **(T-3)**

(2) SQ/CCs may authorize training/functional check flights/operational check flights (FCF/OCF) without a navigator when not required for mission accomplishment. Units will establish procedures regarding the use of navigators on proficiency trainers. **(T-3)** Formal training units (FTUs) will establish procedures regarding the use of navigators on all training missions. **(T-3)**

Navigators are required for training mission conducted below 3,000 feet above ground level (AGL) outside of radar control. **Exception:** Proficiency sorties conducted at local transition fields. **(T-3)**

Navigators are not required when conducting day/night (unaided) landing zone (LZ) operations in the local area.

(3) Two LMs may be required, at the unit commander's discretion, depending on mission complexity.

(4) Two LMs or one LM and another qualified crewmember are required if more than 40 passengers are scheduled to be carried (except during unit moves or contingencies). **(T-3)** The crashworthy seats, if installed, are the primary LM seats. If mission requirements dictate, the AC may exercise discretion for alternate LM seating.

(5) Two LMs will be used on actual equipment/mass container delivery system (CDS) drops utilizing the ramp and door. **(T-3)**

(6) Two LMs will be used on all airdrops 14,000 feet Mean Sea Level (MSL) and above. **(T-3)**

(7) Only one LM is required for tactical missions if: Using only one paratroop door for personnel or door bundle drops (less than 100 lbs.); non-static line personnel are dropped from the ramp and door; dropping only standard airdrop training bundles (SATBs); a no-drop (dry pass) is planned and ground time is sufficient to permit onload or offload by one LM; dropping a single CDS container unilaterally per pass using manual gate cut procedures; or dropping a single LCLA container unilaterally per pass using ramp rigging/single bundle drift back procedures. **(T-3)**

2.2.3. An additional FE or scanner may be used for basic or augmented crews in those units without LM unit manning document authorizations, provided no more than 30 passengers are carried or cargo exceeds 500-lbs. (100-lbs. maximum per single item) or requires special handling in accordance with AFMAN 24-604/TM 38-250/NAVSUP PUB 505/MCO P4030.19J/DLAI 4145.3, *Preparing Hazardous Materials for Military Air Shipments*.

2.2.4. Tactical Airlift Formation Lead Requirements.

2.2.4.1. Definitions:

2.2.4.1.1. Flight lead crew: consists of a pilot and navigator who are either flight lead certified or are receiving lead upgrade training from an instructor of like crew position. A flight lead crew can accomplish mission commander duties, lead multiple element formations, and perform element lead duties in a multiple element formation.

2.2.4.1.2. Element lead crew: consists of a pilot and navigator who are either element lead certified or are receiving element lead upgrade training from an instructor of like crew position. Can perform element lead duties in a multiple element formation.

2.2.4.1.3. Deputy lead crew: a flight lead crew that is ready to assume formation lead duties if the formation lead aborts. A deputy lead is required for formations greater than 4 aircraft. **(T-3)** Deputy lead may fly as the number 2 aircraft in the first element or may fly as second element lead. If another aircraft (not the deputy) occupies the number 2 position, the mission commander must brief a plan for number 2 in case lead breaks out of the formation. **(T-3)**

2.2.4.1.4. An Element consists of 2 aircraft. A Flight consists of 3 or 4 aircraft.

2.2.4.2. Unilateral training visual meteorological conditions (VMC) - no special requirements.

2.2.4.3. Unilateral training Instrument Meteorological Conditions (IMC).

2.2.4.3.1. Single-element formations. A flight lead crew is required or one instructor pilot (IP) is required in the formation (any position). **(T-3)** Units will apply sound Crew Resource Management (CRM) principles for determining if the IP needs to provide direct or indirect supervision. **(T-3)** For IMC airdrops, a flight lead crew is required in the formation lead position. **(T-3)**

2.2.4.3.2. Multiple-element formation. A flight lead crew or IP is required in the formation lead and deputy lead (if required) positions and in each flight lead position. **(T-3)** Units will apply sound CRM principles for determining if the IP needs to provide direct or indirect supervision. **(T-3)** Element lead positions require a flight lead crew, element lead crew or IP. If deputy lead or element lead aborts after station time, any crew can assume their position with the concurrence of the mission commander (MC). Any crew can fly the last ship of a formation even if it is a deputy lead or element lead position. **(T-2) Exception:** Multiple-element formation consisting of two aircraft (one in the flight lead and one in the element lead positions) may use single-element formation crew complement criteria specified in **paragraph 2.2.4.3.1**.

2.2.4.4. Other than unilateral (IMC and VMC). A flight lead crew is required in the formation lead and deputy lead positions. **(T-3)** Element lead positions require a flight lead or element lead crew. Any crew can fly the last ship of a formation even if it is a

deputy or element lead position. For IMC airdrops, every flight, deputy lead and element lead required crew must also be an Radar Verified Airdrop (RVAD) crew. **(T-2)**

2.2.5. Night vision goggle (NVG) Aircrew Complement. An NVG crew consists of an NVG certified crewmember in each of the primary crew positions (a crewmember in upgrade supervised by a qualified instructor in that position meets this requirement). **(T-1)** However, the pilots, navigator, and engineer may use NVGs even if the LM is not NVG certified. LMs may use NVGs even if the pilots, navigator, or FE are not NVG certified.

2.2.6. Joint precision airdrop system (JPADS) aircrew complement. JPADS/Improved-CDS (ICDS) crews consist of JPADS extra-light (XL) certified basic airdrop crew and a precision airdrop system (PADS) operator (PO). Navigators can serve as a primary crewmember and PO on C-130H aircraft. The PO does not have to be mission design series (MDS) qualified but must be a rated airdrop qualified officer. **(T-2)** It is essential the PO receive a thorough briefing prior to performing duties on aircraft other than their primary MDS. **(T-2)**

2.3. Aircrew Member Qualification. An aircrew member will be qualified, or in qualification training, to perform duties as a primary aircrew member. **(T-2)** Refer to DAFMAN 11-401, *Aviation Management,* for procedures and requirements governing senior leader flying.

2.4. Pilots. An IP must supervise non-current or unqualified pilots regaining currency or qualification (direct IP supervision during critical phases of flight). **(T-2)**

2.4.1. SQ/CCs shall augment the PIC for missions over 16 hours FDP and designate those additional pilots authorized to perform PIC duties. **(T-3)** The PIC shall brief the aircrew on the plan to transfer PIC duties. **(T-3)**

2.4.2. Missions with passengers. Only current and qualified pilots (possessing an AF Form 8, *Certificate of Aircrew Qualification*) will occupy pilot seats with passengers on board (N/A Mission Essential Personnel **(**MEP)). **(T-2)** A non-current but qualified pilot under direct IP supervision may fly with passengers on board.

2.4.3. ACs may perform max effort landings from the right seat when authorized by SQ/CC and while under direct IP supervision. **(T-3)**

2.4.4. See **paragraph 7.1.3** for additional training restrictions.

2.5. Navigators. A non-current or unqualified navigator may serve as a primary aircrew member on any mission when supervised by a qualified instructor. SQ/CCs or deployed MCs may generate aircrews without a navigator when weather, area navigation (RNAV) capability, or mission requirements allow. The SQ/CC or deployed MC will publish procedures for navigators to enplane/deplane on proficiency trainers. **(T-3)**

2.5.1. Grid Navigator Requirement. SQ/CC shall include a grid-certified navigator on aircrews tasked to fly north of 65°N latitude, south of 70°S latitude, or in airspace where FLIP enroute charts indicate compass indications may be erratic or depict airways, tracks, or navigational aids as oriented to true or grid north (e.g., northern Canadian airspace). **(T-2)** **Exceptions:** 1) Flights within Alaskan airspace; 2) Flights on published airways using magnetic references (destination and alternates must have published magnetic instrument approaches); 3) Aircraft equipped with two or more operable independent navigational systems.

2.5.2. Adhere to the following criteria to determine if an aircrew requires a navigator for flights within Alaskan airspace: **(T-2)**

2.5.2.1. SQ/CC may form aircrews without a navigator for flights on published airways based on magnetic references as long as the destination and alternate airfields have published instrument approaches based on magnetic headings (weather permitting).

2.5.2.2. SQ/CC may form aircrews without a navigator when the aircraft is equipped with two or more operable independent navigational systems, weather permitting.

2.5.2.3. SQ/CC shall include a grid-certified navigator on aircrews postured to perform rescue alert at Joint Base Elmendorf-Richardson or Keflavik Naval Air Station (NAS). **(T-2)**

2.6. Flight Engineers and Loadmasters. A non-current or unqualified FE or LM may serve as a primary aircrew member on any mission when supervised by a qualified instructor.

2.7. Scheduling Restrictions. In accordance with AFMAN 11-202V3, *Flight Operations*.

2.8. Crew Rest/Enroute Ground Time. The Prime Knight program streamlines the process of getting aircrews from aircraft parking ramp into lodging/crew rest. It is only successful when billeting agents receive accurate aircrew/mission information in a timely manner.

2.8.1. Off-station/Enroute Ground Time. Mobility planners shall provide aircrews at least 16 hours ground time (nuclear airlift missions will be in accordance with AFMAN 13-526, *Nuclear Airlift Operations)* between engine shutdown and subsequent takeoff. **(T-2)**

2.8.1.1. Mission planners, PICs, or Command and Control (C2) agents may modify ground time as follows:

2.8.1.1.1. In the interest of safety.

2.8.1.1.2. To start (mission reporting time) no earlier than 12 hours from the time the aircrew entered crew rest. Before reducing ground time, PICs will consider time to complete mission planning, cargo on/off-load, and non-standard mission related duties. **(T-3)** C2 agents will not ask PICs to accept less than 16 hours ground time. **(T-2)**

2.8.1.2. Mobility planners should construct mission itineraries with enroute ground times longer than 16 hours to afford aircrew members opportunities to recover from the cumulative effects of fatigue caused by flying on several consecutive days or due to transiting several time zones. If practical, make the enroute ground time 36 hours (maximum) after three consecutive near maximum FDPs.

2.8.2. Command and Control Center (C2) Agent Responsibilities. A MAJCOM C2 agent will forward information on the departing aircrew's orders to a Point of Contact (POC) for the next crew rest location's Prime Knight function. **(T-3)**

2.8.3. PIC Responsibilities. If departing from a location with a C2 agency, ensure a C2 agent has accurate aircrew/mission information to forward to the next Prime Knight POC. If departing from a facility without a C2 agency, the PIC will call the next crew rest location Prime Knight POC to pass aircrew/mission information. **(T-3)**

2.8.4. SQ/CC or designated authenticating official shall ensure temporary duty (TDY) Flight Authorizations clearly indicate the unit fund cite so that the PIC may make Prime Knight

reservations in advance. **(T-3)** Without a unit fund cite on the TDY Flight Authorizations, the PIC must make advance reservations using a government travel card to participate in the Prime Knight program. **(T-3)**

2.9. Alerting Procedures. Aircrew alert time is normally 3+15 hours (3+45 for actual/unilateral airdrop missions) before scheduled takeoff time (allows 1 hour for reporting and 2+15 hours [2+45 for actual/unilateral airdrop missions] for mission preparation). Operations Group Commanders (OG/CCs) may establish self-alert procedures for local training missions.

2.10. Orientation Flights and Incentive Flights. Refer to DODI (Department of Defense Instruction) 4515.13, *Air Transportation Eligibility*, DAFMAN 11-401, and the appropriate MAJCOM supplement.

2.11. Interfly. In accordance with AFMAN 11-202V3_AMCSUP. Aircrew members shall be current and qualified in the MDS, as well as unique systems or configuration required to fly the aircraft/mission unless under the direct supervision of an instructor. (T-1)

2.12. Mission Essential Personnel (MEP). In accordance with AFMAN 11-202V3_AMCSUP.

Chapter 3

AIRCRAFT OPERATING RESTRICTIONS

3.1. Objective. Redundant systems may allow crews to safely perform some missions when a component/system is degraded. The PIC is the final authority in determining the overall suitability of an aircraft for the mission. The PIC will ensure a detailed explanation of the discrepancy is entered in the Air Force Technical Order (AFTO) Form 781A, *Maintenance Discrepancy and Work Document*; include the following maintenance identifiers to effectively communicate aircraft maintenance status. **(T-3)**

3.1.1. Mission Essential (ME). The PIC will designate an item, system, or subsystem component essential for safe aircraft operation as ME. **(T-3)**

3.1.2. Mission Contributing (MC). The PIC will designate an item, system, or subsystem component, which is not currently essential for safe aircraft operation as MC. **(T-1)** These discrepancies should be cleared at the earliest opportunity. If circumstances change or mission safety would be compromised, re-designate as ME. Do not delay a mission to clear a MC discrepancy. **(T-3)**

3.1.3. Open Item (OI). The PIC will designate discrepancies not expected to adversely impact the current mission or any subsequent mission as an OI. **(T-3)** These items are normally cleared at home station.

3.2. Minimum Equipment List (MEL) Guidance. The MEL is a pre-launch document that lists the minimum equipment/systems to operate the aircraft. It is impractical to prepare a list that would anticipate all possible combinations of equipment malfunctions and contingent circumstances. Consider equipment/systems in the MEL with no listed exceptions as grounding items. A PIC who accepts an aircraft with degraded equipment/systems is not committed to subsequent operations with the same degraded equipment. PICs are not committed to operations with degraded equipment accepted by another PIC.

3.2.1. The PIC shall account for the possibility of additional failures during continued operation with inoperative (INOP) systems or components. **(T-3)** The MEL is not intended for continued operation over an indefinite period with systems/subsystems INOP.

3.2.2. All emergency equipment will be installed unless specifically exempted by mission requirements/directives. **(T-3)**

3.2.3. Waiver Guidance. A PIC prepared to operate with a degraded MEL item shall request a waiver through C2 channels. **(T-3)** The PIC shall provide the C2 agent: 1) nature of request, 2) individual crewmember qualification, 3) mission leg(s) requiring the waiver, 4) weather or other adverse condition, and 5) the governing directive of waiver request to include volume, chapter, or paragraph. **(T-3)** Initiate waiver requests as soon as possible; plan at least a 1-hour waiver process time. **(T-3)**

3.2.4. PICs operating with waiver(s) for degraded equipment shall coordinate mission requirements (e.g., revised departure times, fuel requirements, maintenance requirements) with the controlling C2 agency and/or flight manager (FM). **(T-3)**

3.2.5. If beyond C2 communication capability, or when it is necessary to protect the crew or aircraft from a situation not covered by this chapter and immediate action is needed, the PIC

may deviate according to **paragraph 1.4** Report deviations (without waiver) through channels to MAJCOM/A3/DO within 48-hours. **(T-2)** OG/CCs shall collect background information and submit a follow-up written report upon request. **(T-3)**

3.3. Waiver Protocol. Waivers to operate with degraded equipment are granted on a case-by-case basis. The PIC determines the need for a waiver after coordinating with the lowest practical level of command. MEL waiver authority is as follows:

3.3.1. The MEL waiver authority is the Wing Commander (WG/CC) or equivalent with mission execution authority, delegable no lower than the OG/CC. **Exception**: For missions where the OG/CC is the execution authority, the MEL waiver authority is the OG/CC.

3.3.2. Other Than MEL Waivers. Determine governing source document (e.g., AFI, AFMAN, Flight Manual, Maintenance T.O.) to ascertain the waiver authority. Use C2 channels to notify the appropriate waiver authority. Waivers of this nature may require an extended response time.

3.3.3. Engineering Dispositions (ED). Dispositions are requested when aircraft are damaged and/or established maintenance technical order procedures cannot be followed or do not exist. The on-site maintenance authority is responsible for requesting Engineering Dispositions. Most EDs allow maintenance to repair the aircraft and return it to unrestricted maintenance status; dispositions of this nature do not concern aircrews. However, EDs affecting aircrew operations require MEL waiver authority approval. **(T-2)**

3.3.3.1. PICs shall coordinate dispositions containing flight restrictions, prohibitions, additional operating limits, or modified/nonstandard operating procedures with the appropriate MEL waiver authority. **(T-3)**

3.3.3.2. PICs will not accept dispositions appearing incomplete, in error, or unsafe. **(T-3)** Prior to rejecting a disposition, the PIC will contact the appropriate MEL waiver authority. **(T-3)** Resolution of the issue is the responsibility of the waiver authority.

3.4. Technical Assistance. The PIC may request technical support and additional assistance from their home unit or MAJCOM C2 agency.

3.5. MEL Table Definitions/Column Identifiers. MEL **Tables 3.1** through **3.15** are arranged by aircraft system to provide the PIC a mechanism to determine minimum system requirements. Components are listed by number installed and minimum required for flight. An asterisk (*) in the Required column indicates the number required and is situation dependent; refer to the Remarks/ Limitations/Exceptions column for clarification. The PIC determines if the asterisk (*) applies. Waivers are not required for asterisk (*) items. Requirements will not normally be waived when transiting a facility that has the parts and maintenance required to bring the aircraft to full mission capable status. **(T-3)** Asterisk items marked "must be repaired upon reaching a facility that has the parts/maintenance capability" are required for local training operations originating and terminating at home station (not off-station training).

3.5.1. Remarks/Limitations/Exceptions. Some technical information and procedures are contained in this column. This is not all-inclusive; crewmembers shall refer to the flight manual and other directives for procedures, techniques, limitations, etc. **(T-3)**

3.5.2. One-time flight clarification: A red X discrepancy must be downgraded through maintenance channels prior to flight. **(T-3)** MEL waiver may still be required. This condition

does not preclude carrying cargo and passengers unless stipulated otherwise by the waiver. The priority is to move the airplane to a repair capable facility. PICs must coordinate with appropriate agencies to ensure repair capability exists at the destination. **(T-3)** One-time flights may include enroute stops only when necessary to recover the airplane. **Example:** An airplane departs on a gear down flight from Djibouti initial approach point and requires an enroute fuel stop (Cairo) before landing at the nearest repair capable facility, Sigonella NAS.

3.5.2.1. One-time flight to nearest repair capable facility: Flight is limited to the nearest (shortest enroute time) repair capable base.

3.5.2.2. One-time flight to a repair capable facility: Flight is not restricted to the nearest repair capable facility.

3.5.3. Other mission and repair clarifications:

3.5.3.1. Shall be repaired at next repair capable facility: Mission may continue as scheduled. **(T-2)** Item shall be repaired upon reaching a repair facility. Designate item ME upon reaching repair facility. Once maintenance action is initiated, and it is determined repairs are not possible (e.g., no parts/maintenance specialists), the PIC will discuss possible courses of action with C2 agency to return aircraft to service. **(T-2)**

3.5.3.2. Mission dictates requirement: PIC shall consider the entire mission profile, not just the next leg. **(T-3) Example:** An airplane is departing an enroute station with repair capability, after engine start the FE discovers the #1 engine anti-ice is INOP. Icing conditions are not forecasted for the next leg. However, because the mission spans several days and repair capability does not exist at the scheduled enroute stops, the PIC elects to have the item repaired prior to departing.

3.6. C-130H MEL. This MEL lists the minimum equipment and systems to launch the aircraft under routine operations. The MEL does not include all equipment or systems essential to airworthiness. The MEL is not intended to promote continued operation of the aircraft for an indefinite period with systems/subsystems INOP. Due to the various configurations of C-130Hs, the number in the "Installed" column is a representation of the majority of the aircraft. If the series requirement is different than the number shown, there is no waiver requirement for the number installed.

Table 3.1. Engines/Auxiliary Power Unit (APU).

Item/System	Installe	Required	Remarks/Limitations/Exceptions
Engines	4	4	Do not takeoff with nonstandard aircraft configuration or power unless a hostile threat to the aircraft and/or crew makes it imperative. Do not takeoff unless all four engines achieve takeoff power settings
Torquemeter	4	4	
Tachometer	4	4	
Turbine Inlet Temperature Indicators	4	4	

Fuel Flow Gauges	4	4	
Oil Temperature Gauges	4	4	
Oil Pressure Gauges	4	4	
Oil Quantity Gauges	4	4*	One oil quantity gauge may be INOP provided the oil quantity is verified prior to flight and the Low Oil Quantity light is operational.
Low Oil Quantity Light	1	1*	If INOP, all four oil quantity gauges must be operational. **(T-3)**
Oil Cooler Flap	4	4*	Oil Cooler Flap may be INOP if the Flap can be manually positioned to open and fixed and oil temperature can be maintained within normal limits.
Oil Cooler Flap Position Indicator	4	4*	Oil Cooler Flap Position Indicator may be INOP provided oil temperature can be maintained within normal
APU	1	1*	If the APU fails, flight in VMC is authorized provided no other electrical malfunctions exist. If the APU generator is INOP, the generator will be removed and padded prior to operation of the APU. **(T-3)**

Table 3.2. Propellers.

Item/System	Installed	Require	Remarks/Limitations/Exceptions
Propeller	4	4	Propeller may be operated with a feather override failure where the override button fails to pop out at full feather (faulty pressure switch), provided maintenance instructions in the applicable fault isolation manual are followed and no other system is affected.
Synchrophaser	1	1*	Must be repaired upon reaching a facility that has the parts/maintenance capability, provided no other portion of the propeller system is affected.**(T-3)** Synchrophaser will be removed. **(T-3)**
Propeller Maintenance Panel	1	1	

Table 3.3. Electrical System.

Item/System	Installe	Require	Remarks/Limitations/Exceptions
Generators, Engine-Driven	4	4*	One generator may be INOP provided: If the AC generator is not equipped with a generator disconnect, the shaft will be removed or the generator will be removed and the generator mount padded before flight. **(T-3)** Local training missions may continue after a generator is disconnected or removed and the mount padded, provided no other electrical malfunction exists.
Bus Switching Unit (BSU)	2	2*	One may be INOP provided: The #1 BSU is operational.
Transformer Rectifiers (TR)	4	4*	One Essential TR unit may be INOP for one-time flight to a repair capable facility provided no other electrical malfunction exists.
LH DC Transformer Rectifier	1	1*	Theater Specific Instructions (SPINS) dictate requirements.

APU Generator	1	1*	If the APU generator fails, flight in VMC is authorized provided no other electrical malfunctions exist. APU generator will be removed and padded before operation of the APU. **(T-3)**
Generator Out Lights	4	4*	If a generator has been disconnected or removed and padded, its associated indicators do not have to be operational. All associated equipment and indicators will be operational for each operative engine-driven generator (e.g., generator control panel, Generator Control Unit (GCU), voltage regulator, generator out/caution light, AC loadmeter). **(T-3)**
AC Loadmeter	4	4*	If a generator has been disconnected or removed and padded, its associated indicators do not have to be operational. All associated equipment and indicators will be operational for each operative engine-driven generator (e.g., generator control panel, GCU, voltage regulator, generator out/caution light, AC loadmeter). **(T-3)**

Table 3.4. Anti-Ice/De-Ice System.

Item/System	Installe	Require	Remarks/Limitations/Exceptions
Ice Detection System	1	1*	Mission dictates requirement. Will be operational for flight into known or forecast icing conditions. **(T-3)**
Pitot-Heat System	2	2	
TAS Probe Heat	1	1*	Mission dictates requirement. Will be operational for flight into known or forecast icing conditions. **(T-3)**
Wing/Empennage Anti-Icing System	2	2*	Mission dictates requirement. Will be operational for flight into known or forecast icing conditions. **(T-3)**
Engine Inlet Air Duct Anti-Icing Systems	4	4*	Mission dictates requirement. Will be operational for flight into known or forecast icing conditions. **(T-3)**
Leading Edge Temperature Indicators	6	6	

Wing Leading Edge and Wheel Well Overtemperature **WARNING** Lights	7	7	
Propeller Anti-Icing and De-icing Systems	4	4*	Mission dictates requirement. Propeller Blade De-Icing will be operational for flight into known or forecast icing conditions. **(T-3)**
Windshield Anti-Icing Systems	2	2	

Table 3.5. Air Conditioning, Pressurization and Bleed Air.

Item/System	Installe	Require	Remarks/Limitations/Exceptions
Flight Deck and Cargo Compartment Air Conditioning Units	2	2*	Pressurization and both air conditioning systems should be operational for special weapons missions. Repair as soon as practical. Ensure that an acceptable pressure and temperature can be maintained with operable systems. Coordinate with the senior medical AECM when patients are carried. Brief passengers and patients on the possibility that discomfort may be encountered.
Auxiliary Vent Valve	1	1	
Safety Valve	1	1	
Flight Deck/Cargo Compartment Temperature Control	2	2*	Automatic or manual system may be INOP if the other is operable.
Under Floor Heat System	1	1*	Mission dictates requirement.
Cabin Pressure Controller	1	1*	Automatic controller may be INOP for pressurized flight provided the manual controller is operative. May be INOP for unpressurized flight.
Cabin Altimeter	1	1*	May be INOP for unpressurized flight.

Cabin Differential Pressure Indicator	1	1*	May be INOP for unpressurized flight.
Cabin Rate of Climb Indicator	1	1*	May be INOP for unpressurized flight.
Emergency De-Pressurization Switch	1	1	

Table 3.6. Doors and Ramp Systems.

Item/System	Installed	Require	Remarks/Limitations/Exceptions
Ramp Locking System	1	1*	Ensure **WARNING** light, latching mechanisms, and locking system are operative for pressurized flight. Aircraft will not be released for flight with a malfunctioning ramp lock system, with cargo on the ramp. **(T-3)** Aircraft may continue to destination if ramp locks malfunction in-flight. Cargo ramp will not be operated in flight, with cargo on the ramp, with malfunctioning locks. **(T-3)** Unpressurized flight, with no cargo on the ramp, may be performed with a cargo ramp lock malfunction when mission requirements dictate.
Aft Cargo Door Locking System	1	1*	Mission may continue. Pressurized flight may be performed with an aft cargo door lock malfunction when mission requirements dictate.
Crew Entrance Door and **WARNING** Light	1	1	

Table 3.7. Hydraulics.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Engine-driven Hydraulic Pumps	4	4	
Utility/Booster System Engine Pump Pressure **WARNING** Lights	4	4	

Utility System Hydraulic Pressure Indicator	1	1	
Booster System Hydraulic Pressure Indicator	1	1	
Hydraulic Suction Boost Pumps	2	2	
Auxiliary Hydraulic Pump	1	1	
Auxiliary Hydraulic Pressure Indicator	1	1*	Direct reading gauge in cargo compartment may be INOP.
Rudder Boost Pressure Indicators	2	2	

Table 3.8. Landing Gear.

Item/System	Installed	Require	Remarks/Limitations/Exceptions
Landing Gear System	1	1*	Must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)** In the event of an actual or suspected landing gear malfunction, the gear will not be moved from the down and locked position. **(T-3)** If landing gear has been tied down in accordance with Flight Manual emergency procedures, no further flights are authorized until repair is made or inspected by authorized maintenance personnel. Flight (including enroute stops) with landing gear doors removed may be accomplished to a destination with repair capability.
Landing Gear Position Indicators	3	3*	Must be repaired upon reaching a facility that has the parts/maintenance capability. Gear will not be moved from the down and locked position. **(T-3)**

Landing Gear **WARNING** Light	1	1*	Must be repaired upon reaching a facility that has the parts/maintenance capability. Gear will not be moved from the down and locked position. **(T-3)**

Table 3.9. Brake/Antiskid Systems.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Wheel Brakes	4	4	
Parking Brake	1	1	
Antiskid	1	1*	Maximum effort landings with antiskid INOP are not authorized. A local training flight may continue if the antiskid fails provided the system is turned off. Multiple landings or formation landings will not be accomplished. **(T-3)**

Table 3.10. Fuel System.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Main Tank Fuel Pumps	4	4*	On aircraft with dump mast shutoff valve switches, one main tank fuel boost pump may be INOP for one-time flight to a repair capable facility, provided the respective fuel dump pump is operational.
Main Tank Dump Pumps	4	4	
Auxiliary Tank Fuel Pumps (per tank)	1	1*	Mission dictates requirement. Auxiliary tank fuel pumps will be operational for any tank containing fuel. **(T-3)**
External Tank Fuel Pumps (per tank)	2	2*	Mission dictates requirement. One (1) pump will be operational for any tank containing fuel. **(T-3)**

Main Fuel Quantity Indicators (See **Note 1**)	4	4*	One main fuel tank indicator may be INOP provided: Both the tank with the INOP indicator and its symmetrical tank quantity are visually verified by a crewmember using the fuel tank dip stick. Reference Fuel Quantity Conversion Data chart in 1C-130H-2-12JG-10-1 for applicable fuel type with foam. At enroute stops when engines are shut down, the tank with the INOP indicator and the symmetrically opposite tank will be dip checked. **(T-3)** Crossfeed operation will begin when the symmetrically opposite quantity indicator has decreased to 1,500 lbs. (inboards) and 2,500 lbs. (outboards). **(T-3)** Engine out training using the engine corresponding to the INOP indicator or its symmetrical opposite will not be conducted during tank to engine operation. **(T-3)** Flights consisting of multiple stops when the mission profile does not allow dipping of tanks (e.g., Engine Running Onload/Offload (ERO), local trainers) will terminate with a minimum of 8,000 lbs. calculated main tank fuel. **(T-3)** Local training flights may be conducted with two INOP main tank indicators provided: INOP indicators are asymmetrical. Main tanks fuel quantity is visually

External Fuel quantity Indicator (See **Note 1**)	2	2*	One external fuel tank indicator may be INOP provided both external fuel tanks are checked full or empty. Both external fuel tank indicators may be INOP provided both external tanks are verified empty. When an external tank indicator is INOP and the tank cannot be visually checked empty due to foam modification, comply with the following prior to flight: Check pressure with each pump in the external tank. If no pressure is obtained, the tank is verified empty. If pressure is obtained, ground transfer the fuel from the external tank. Defuel the external tank if unable to ground transfer. When unable to verify an external tank is empty prior to engine start, the tank will be placed on crossfeed until no pressure is obtained prior to takeoff. **(T-3)** **Exception:** LC-130Hs conducting Antarctic Operations may operate with partial fuel loads in the external fuel tanks with one external fuel quantity indicator INOP provided both tanks are visually verified and all main tank fuel
Auxiliary Tank Fuel Quantity Indicators	2	2*	If fuel quantity indicator is INOP, fuel quantity will be verified with the magnetic sight gauge. **(T-3)**
Note 1: Both a main and external fuel tank indicator may be INOP on the same wing provided the limitations listed for a single INOP main fuel tank indicator and a single external fuel tank indicator are followed.			

Table 3.11. Flight Recorder/Locating Systems.

Item/S	Installed	Required	Remarks/Limitations/Exceptions
Flight Data Recorder (FDR)	1	1*	If the FDR is INOP but the CVR is operational, flight is authorized but must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**

Cockpit Voice Recorder (CVR)	1	1*	If the CVR is INOP but the FDR is operational, flight is authorized but must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**
Emergency Locator Transmitter	1	1	
Underwater Acoustical	1	1	

Table 3.12. Fire Protection/WARNING Systems.

Item/System	Installed	Required	Remarks/Limitations /Exceptions
Fire Extinguisher	2	2	
Engine Fire and Turbine Overheat **WARNING** Systems	4	4	
Nacelle Overheat **WARNING** System	4	4	
APU Fire **WARNING** System	1	1	

Table 3.13. Flight Instruments.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Airspeed Indicator	3/2	2*	Both pilot airspeed indicators must be operational. **(T-3)** LC-130H-L2 Aircraft require all 3 airspeed indicators to be operational.
Vertical Velocity Indicator or Vertical Velocity Speed Indicator	2	2*	One may be INOP. **Exception:** two must be operational for NVG airland missions and flights in Reduced Vertical Separation Minimum (RVSM) airspace. **(T-3)**

Flight Director Systems	2	2*	PIC will determine the minimum flight director system components required for the mission. **(T-3)**
Attitude Director Indicator (ADI)	2	2*	One turn needle may be INOP provided no other malfunctions exist on either ADI. (On airplanes prior to AF78-0806, modified by TCTO 1C-130-1391 and TCTO 1C-130-1333).
Standby ADI (if installed)	1	1	
Horizontal Situation Indicators (HSI)	2	2*	One may be INOP. INOP HSI must be in the copilot position. **(T-3)**
Electronic Flight instrument (EFI) Displays (if	4	4*	One may be INOP provided: INOP EFI must be in the copilot HSI position. **(T-3)**
Bearing Distance Heading Indicator (BDHI)	4	4*	Two may be INOP provided at least one pilot and one navigator BDHI is operational.
Barometric Altimeters	3	3*	One may be INOP provided: Both pilots' altimeters must be operational. **(T-3)**
Combined Altitude Radar Altimeter (CARA) (pilot's indicator)	1	1*	Must be operational during NVG operations. Must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**
Ground Proximity **WARNING** System (GPWS) (if equipped)	1	1*	Must be operational when carrying passengers. Must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**
Ground Collision Avoidance System (GCAS) (if equipped)	1	1*	Must be operational when carrying passengers. Must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**

Traffic Collision and Avoidance System (TCAS) (if equipped)	1	1*	Must be operational when carrying passengers/troops. **(T-3)** Must be operational during other than day VFR operation. **(T-3)** Must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**
Digital/Central Air Data Computer (if	1	1	
#1 Ultra High Frequency (UHF) Manual Control Head Radio (SCNS	1	1	
HF Radio	2	2*	Both may be INOP. Mission dictates requirement.
ADS-B	1	1*	Only required if mission profile or airspace requires ADS-B out. OPSEC/EMCON guidance may require turning system off.

Table 3.14. Navigation Systems.

Item/System	Installed	Required	Remarks/Limitations/Exceptions
Standby Magnetic Compass	1	1	
Heading Systems	2	2* 1*	See **paragraph 3.8**.
VHF Omni-Directional Range (VOR)/Instrument Landing System	2	2*	One may be INOP for training sorties.
Automatic Direction Finder (ADF)	2	2*	Both may be INOP. Mission dictates requirement.

TACAN	2	2*	One may be INOP for training sorties.
AN/APN-241 Radar	1	1*	Mission dictates requirement. Required if known or forecast adverse weather conditions exist along the route of flight. Required for single-ship night tactical low-level flight. Required for RVAD operations. Not required for night tactical low-level formation flight as long as another formation member has an operable radar. When no navigator is on board, the pilot's display/sweep is required for flight if known or forecast thunderstorms are expected along the route of flight. **(T-3)**
Identification Friend or Foe (IFF)/ Selective Identification Feature (SIF)	1	1*	Aircraft will not depart with an IFF known to be INOP. **(T-3)** If self-test fails, takeoff is permitted if the IFF was operational on the previous mission. **Exceptions:** Formations must have at least one operational IFF per element. **(T-3)**

Table 3.15. Aircraft Exterior/Interior Lighting.

Item/System	Installed	Require	Remarks/Limitations/Exceptions
Landing Lights	2	2*	One may be INOP provided: The wheel well taxi light on same side is operational.
Wheel Well Taxi Lights	2	2*	One may be INOP provided: The landing light on the same side is operational.
Wingtip Taxi Lights	2	2*	One may be INOP.
Formation Lights	9	9*	Mission dictates requirement. Only required for night visual formation flights; two per wing will be operational. **(T-3)**

Navigation Lights	6	6*	For night operations, the left and right wingtip Navigation lights must be operational in addition to one of the white lights on the tail cone. **(T-3)** Other lights may be
Anti-Collision/Strobe Lights	2	2*	One may be INOP provided: Must be repaired upon reaching a facility that has the parts/maintenance capability. **(T-3)**
Wing Leading Edge Lights	2	2*	Both may be INOP. Mission dictates requirement.
Primary Instrument Cockpit Lighting	1	1*	Mission dictates requirement. All edge "peanut" lighting or backlit lighting (depending on aircraft model) will be operational for night operations for the following instruments: airspeed, altimeters, Vertical Velocity Indicator (VVI)/Vertical Speed Indicator (VSI), ADI, and HSI. **(T-3)**

3.7. Supplements. Each MAJCOM may supplement the MEL (see **Chapter 1**).

3.8. Navigation Systems.

3.8.1. For flights in North Atlantic High Level Airspace (NAT-HLA) or the routes connecting Composite Hawaii to Mainland US Route System, the following fully operable navigation systems are considered the minimum necessary to permit compliance.

3.8.1.1. Self-Contained Navigation System (SCNS) aircraft. Fully operational SCNS, to include the navigator's Integrated Display Computer Unit (IDCU) and either the pilot or copilot's IDCU. (T-3)

3.8.1.2. Compass systems. Two independent heading references required (e.g., 2 compasses or 1 compass and SCNS). When two systems are installed, both should be operational. If one system fails, refer to the flight manual to determine what other equipment is affected. (T-3)

3.8.2. For flights on all other Class II routes (formerly known as Category I routes), the PIC determines the minimum navigational capability required to safely accomplish the mission. Consider the following: length and route of flight, weather, and experience and proficiency of the crew.

3.8.3. Equipment listed in DoD FLIP AP/2, *Area Planning Europe-Africa-Middle East*, for permitting compliance with NAT-HLA is mandatory. (T-0). Loss of any component before track entry requires return to a station with maintenance capability or re-filing via specified routes.

3.8.4. Performance Based Navigation (PBN) certifications (Required Navigation Performance (RNP)-10/B-RNAV) are contingent on receiving a medium accuracy alignment of the INU and operating with at least one fully operational INU with autopilot engaged.

3.9. Gear Down Flight Operations. Limit gear down flight operations to sorties required to move the aircraft to a suitable repair facility. Consider gear down flight only after the PIC exhausts all avenues to repair the aircraft in place.

3.9.1. Standard climb-out flight path charts in T.O. 1C-130H-1-1, *C-130H Performance Data,* assume gear retraction initiated three seconds after takeoff. For gear down operations, drag index must be applied using the Effect of Variant Configurations on Climbout Flight Path charts. (T-3). PICs shall not takeoff until there is reasonable assurance that they will achieve/maintain adequate obstacle clearance (to include enroute stops and alternates). (T-3)

3.9.2. Time and communications capability permitting, validate takeoff data with MAJCOM STAN/EVAL or Operations Group STAN/EVAL (OGV).

3.10. NVG Minimum Operating Equipment. The following equipment is required for NVG operations:

3.10.1. TCAS. Exception: System must be operational but OPSEC/Emissions Control (EMCON) guidance may require turning system off. (T-3)

3.10.2. Pilot's radar altimeter. (T-3)

3.10.3. SCNS with a minimum of one Global Positioning System (GPS) or inertial navigation system (INS) must be operational for low-level flights flown using NVG enroute altitudes. (T-3) If the GPS and the INS (both INSs if 2 are installed) are INOP, climb to Minimum Safe Altitude (MSA). Exception: Wingmen may fly in-trail at NVG enroute altitudes as long as a GPS or INS is operational in the lead aircraft.

3.10.4. AN/APN-241.(T-3) Radar is required for single-ship, night, low-level flight. Not required for formation, night, low-level flight as long as another formation member has an operable radar. Note: Not required for local LZ operations.

3.10.5. Vertical Velocity Indicator or Vertical Speed Indicator. (T-3)

3.11. Autopilot Considerations. Multiple variations in installed autopilot systems allow for different axis engagement. Crews should apply ORM techniques to determine if the autopilot is operational for each specific mission based on their installed autopilot type (automatic flight control system/FCS-105). At a minimum the altitude hold will be operational. (T-3)

Chapter 4

OPERATIONAL PROCEDURES

4.1. Duty Station. Both pilots and the FE shall be in their seats during flight. **(T-0).** One of the pilots, or the FE, may be out of their seat for brief periods to meet physiological needs. Only one pilot, or the FE, may be absent from their duty station at time. With both pilots in their seats, a PIC may authorize rest periods for one pilot occupying a primary duty station during non-critical phases of flight, with the other pilot being awake and alert. **(T-3)** Aircrew members should notify the PIC prior to departing assigned primary duty station.

4.2. Takeoff and Landing Guidance. An AC, or above, will occupy either the left or the right seat during all takeoffs and landings. **(T-3)** The designated PIC (A-code) is not required to occupy a primary position, but still retains overall authority for conduct of the mission.

4.2.1. An AC or IP will make all takeoffs and landings during:

4.2.1.1. Aircraft emergencies, unless conditions prevent compliance. **(T-3)**

4.2.1.2. Airlift of nuclear weapons. **(T-3)**

4.2.1.3. Max effort operations or landings with unimproved airfield operations. Only IPs or ACs under the direct supervision of an IP may conduct maximum effort or substandard airfield operations from the right seat. **(T-3)**

4.2.2. Unless the pilot in the other seat is a certified AC or higher, pilots in command (PIC) with less than 100 hours primary assigned hours (PAH) hours since AC certification will make all takeoffs and landings under any of the following conditions: **(T-3)**

4.2.2.1. Ceiling/visibility less than 300 feet and/or Runway Visual Range (RVR) 4000 (3/4 Statue Mile (SM) visibility). **(T-3)**

4.2.2.2. RCR less than 12. **(T-3)**

4.2.2.3. Crosswind component greater than 15 knots. **(T-3)**

4.2.3. MPD takeoff/landing guidance:

4.2.3.1. Phase I MPD Pilots (FPCs) are only authorized to fly in the right seat. **(T-2)**

4.2.3.2. Phase II MPD Pilots (FPQs) are authorized to perform all takeoffs and landings from the left seat (including all Mission (MSN) events) under the direct supervision of an IP.

4.2.3.2.1. FPQs are not authorized to perform left seat max effort operations at substandard, unimproved or semi-prepared surfaces. **(T-2)**

4.2.3.2.2. FPQs are not authorized to perform right seat max effort operations. **(T-2)**

4.3. Landing Gear and Flap Operating Guidance. The pilot flying (PF) the aircraft will command configuration changes. **(T-2)** The pilot monitoring (PM) the aircraft will verify appropriate limitations and acknowledge the command by repeating it. **(T-2)** The landing gear will be operated by the pilot in the right seat. **(T-2)** The flaps will be operated by the PM. **(T-2)**

4.4. Outside Observer Duties. Available crewmembers will assist in clearing during taxi operations, and any time the aircraft is below 10,000 feet MSL. **(T-3)**

4.5. Seat Belts.

4.5.1. All occupants will have a designated seat with a seat belt. **(T-3)** Crewmembers fasten seatbelts when occupying a duty position, unless crew duties dictate otherwise.**(T-3)** LMs (or other crewmembers) required to be in the paratroop door at the scanning position will have a designated seat (other than the scanning seat) with a seat belt. **(T-3) Exception:** When the loadmaster crashworthy seat is installed, additional designated seat not required.

4.5.2. All crewmembers fasten seat belts during takeoff and landing, unless crew duties dictate otherwise. Fasten shoulder harness, unless crew duties dictate otherwise. Crewmembers performing instructor or flight examiner duties, or are in upgrade training to instructor or flight examiner, are exempt from seat belt requirements if not occupying a primary crew position; however, they will have a seat available with an operable seat belt. **(T-3)**

4.5.3. Loadmasters present in the cargo compartment during takeoff or landing, or while performing scanner duties will occupy the loadmasters crashworthy seat (excludes touch-and-go landings). **(T-3)** If there are more than two loadmasters in the cargo compartment, e.g., traveling to the Area of Responsibility (AOR), the seats are for the primary loadmasters. Helmets are to be worn and paratroop door armor will be installed in actual threat areas. **(T-3)** **Exception:** Loadmasters in MAFFS configured aircraft will sit in the appropriate MAFFS unit control panel seats for takeoffs and landings. **(T-3)** AMC/A3 approves the removal of the left crashworthy seat stanchion for C-130H aircraft for the entire MAFFS season for all designated primary and spare aircraft.

4.5.3.1. When LMs (or other crewmembers) are required to be positioned in the paratroop door for scanning and the loadmaster crashworthy seat is unavailable, use a restraint harness in accordance with AFTTP 3-3.C-130H, *Combat Fundamentals C-130H*.

4.5.3.2. The use of locally manufactured seats or other commercially manufactured seats obtained for LM comfort while performing threat scanning, including takeoffs and landings, are only authorized in conjunction with the restraint harness method outlined above.

4.6. Aircraft Lighting. Aircraft lighting procedures are in accordance with AFMAN 11-202V3, AFMAN 11-218 *Aircraft Operations and Movement on the Ground*, and applicable TOs.

4.6.1. NVG Lighting. Follow the exterior lighting guide in AFTTP 3-3.C-130H for all NVG training situations.

4.6.1.1. Lights-out operations during peacetime will be conducted in accordance with AFMAN 11-202V3. **(T-1)**

4.6.1.2. Total lights out operations are authorized with concurrence of the controlling agency in restricted airspace and warning areas, or locally designated airfields documented in a Letter of Agreement (LOA).

4.6.2. Cargo compartment lighting is determined by the situation and is coordinated between the mission commander/PIC and LM(s). During cargo compartment emergencies, the LM should discontinue NVG use and select full bright on the cargo compartment lights (situation permitting).

4.6.3. Interior lighting will be set-up using night vision imaging system (NVIS) compatible lighting for all NVG airland operations (C-130H harness filter kit or Glendale Filter system

are also acceptable). **(T-3)** Taping with NVG compatible chemical lights is not an acceptable primary lighting scheme for NVG airland operations. **WARNING:** NVGs adjust to the brightest source of light; for that reason, poor cockpit lighting discipline may prevent a successful transition to landing during IMC. Therefore, do not perform an instrument approach in IMC to an NVG landing without NVIS compatible flight deck lighting. **(T-2)**

4.6.4. Aircraft Preparation. For NVG enroute and airdrop operations, aircrews are allowed to tape incompatible lighting and use NVG compatible chemical glow sticks. Some techniques for taping are outlined in AFTTP 3-3.C-130H. NVIS compatible lighting (including lighting harness) is required for all NVG airland operations. **(T-3)**

4.6.5. LM Aircraft Preparation. Taping of lights may be accomplished; however, no more than one layer of tape should be used.

4.7. Advisory Calls. Takeoff. Stating "GO" is only a required call when refusal speed is less than rotate speed. State "GO" at refusal speed if applicable (refusal speed is less than takeoff speed). State "ROTATE" at rotate speed. If takeoff speed is adjusted for wind gusts or Air Minimum Control Speed (Vmca), state "ROTATE" five knots below the adjusted takeoff speed. Any crewmember noting a safety of flight malfunction before hearing "GO" or "ROTATE" (if refusal speed is greater than takeoff speed) will state "REJECT" and a brief description of the malfunction (e.g., "REJECT, number two engine flameout."). **(T-3)** For additional advisory calls, reference AFMAN 11-202V3_AMCSUP.

4.8. Runway, Taxiway, and Airfield Requirements.

4.8.1. Minimum Runway and Taxiway Requirements. For peace-time do not use runways less than 3,000 feet. Minimum runway width is 80 feet (60 feet for max effort). Minimum taxiway width is 30 feet. **(T-3)**

4.8.2. Runway Length for Takeoff and Landing. Minimum runway length for normal takeoff is Critical Field Length (CFL) or Minimum Field Length for Maximum Effort Takeoff for max effort operations. Minimum runway for normal landing is Landing Distance or Ground Roll plus 500 feet for max efforts. For peacetime, compute landing performance with two engines in reverse and two engines in ground idle.

4.8.2.1. Runway Length for Takeoff and Intersection Takeoffs. Normally, the PF initiates takeoffs from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the PIC.

4.8.2.2. Pilots may accomplish intersection takeoffs provided the operating environment (e.g., Gross Weight (GW), obstructions, climb criteria, weather) allows a safe takeoff and departure. Calculate takeoff performance based on the runway remaining from the point at which the takeoff is initiated.

4.8.2.3. During operations on runways partially covered with snow or ice, base takeoff computations on the reported runway surface condition (RSC) or runway condition reading (RCR) for the cleared portion of the runway. A minimum of 40 feet either side of centerline should be cleared (30 feet for maximum effort operations). If 40 feet either side of centerline is not cleared (30 feet for max effort ops), compute takeoff data based on the uncleared portion.

4.8.2.4. Use of Overruns. If approach end overruns are available and stressed or authorized for normal operations, they may be used to increase the runway available for takeoff. Departure end overruns (if stressed and authorized) may also be used for landing if needed.

4.8.3. Maximum Effort Operations. Use maximum effort procedures when conditions (runway dimensions and/or obstacles) or directives require their use. All maximum effort operations must fall in the "recommended" area of charts (corrected for RCR). **(T-3)**

4.8.3.1. Maximum Effort Landing: A maximum effort qualified crew and procedures will be used whenever the runway available for landing is less than that required for a normal landing. **(T-3)** When runway widths less than 80 feet have lengths that fall within performance requirements for a normal landing, max effort crews are required but max effort landing procedures are not. **(T-3)** **Note:** Max effort wind limitations always apply to runways less than 80 feet wide.

4.8.3.2. Maximum Effort Takeoff: Runways less than 80 feet wide require a maximum effort qualified crew but only require maximum effort procedures if runway available is less than critical field length (CFL).

4.8.4. Unprepared Surfaces. Damage to equipment on the underside of the aircraft, AN/ALR-69 antennas in particular, may result when landing on other-than-hard surfaces. Coordinate with maintenance to prepare aircraft by taping or otherwise protecting belly antennas and equipment. When possible, crews should inspect underside equipment following an unprepared surface landing to ensure proper system operation. **Note:** Gravel-surfaced landing strips have increased damage potential; loose aggregate creates increased engine Foreign Object Damage (FOD) potential and can cut tires or hydraulic lines. If the surface aggregate exceeds ½ inch size, consider limiting the number of passes at the LZ.

4.8.5. Other Airfield Requirements.

4.8.5.1. A current LZ survey (within the past 5 years as specified in DAFMAN 13-217, *Drop Zone, Landing Zone, and Helicopter Landing Zone Operations*, is needed before using other than hard-surfaced runways or taxiways (regardless of surface type).

4.8.5.2. RCR and RSC. The performance charts used to determine braking action are based on concrete runways. The RCR values for the following runway surfaces in **Table 4.1** are estimates based on operational experience and should be used only as a guide.

Table 4.1. RCR Values.

TYPE SURFACE	RCR (DRY)	RCR (WET)
Asphalt	23	12
Aluminum Matting	20	10
M8A1/With Antiskid (PSP)	20	8
Clay	16	5
Crushed Rock	16	5

Sand	16	5
M8A1/Without Antiskid (PSP)	13	3

4.8.5.3. Limit C-130H operations into and out of slush or water covered runways to a covering of one inch. This number is based on performance charts where an RSC of 10 is equal to one inch of slush or water. Performance data where more than one inch of slush or water is present may not be accurate.

4.8.6. Takeoff Speeds. If Maximum Effort Takeoff Speed (Vmeto) is used for takeoff, climb until clear of the obstacle at max effort obstacle clearance speed. If Vmca is used for takeoff, climb until clear of the real or simulated obstacle at Vmca + 10 knots.

4.8.6.1. During operational missions only, if obstacles are a factor, use Vmeto and max effort obstacle clearance speed without Vmca corrections. If unable to clear obstacles using Vmeto and maximum effort obstacle clearance speed, reduce aircraft GW or delay mission for more favorable conditions.

4.8.6.2. The PIC makes the decision to use Vmeto or Vmca on operational missions based on a consideration of all available data including: weather, runway length, Vmeto, Refusal Speed (Vr), Vmca, Ground Minimum Control Speed (Vmcg), applicable airfield survey, and a review of hazards, obstructions, and terrain both laterally and along the climb out flight path. **WARNING:** Max effort operations at high altitude, GW, and temperatures are critical; climb angles as low as 2.5 degrees may prevent the aircraft from accelerating. Any further climb angle increase may result in the loss of airspeed and the onset of a pre-stall buffet.

4.8.7. Anti-icing fluid. AMS 1428, Type II and IV anti-icing fluid is authorized for use in extreme climatic conditions. Due to the shearing properties of Type II/IV anti-icing fluid, it may be necessary to increase takeoff speed. When Type II/IV anti-icing fluid is used, increase takeoff speed to a minimum of 110 knots indicated airspeed (KIAS) and make necessary distance corrections to performance data.

4.9. Aircraft Taxi and Taxi Obstruction Clearance Criteria and FOD Avoidance.

4.9.1. In accordance with AFMAN 11-218 and this manual, do not taxi an aircraft within 25 feet of obstructions without wing walkers monitoring the clearance between aircraft and obstruction. With wing walkers, avoid taxi obstructions by at least 10 feet. **Exception:** With WG/CC approval, aircraft may taxi without marshallers/wing walkers at home station along fixed taxi lines which have been measured to ensure a minimum of 10 feet clearance from any obstruction and the obstruction is permanent. Adjacent aircraft are also considered a permanent obstruction, provided the aircraft is parked properly in its designated spot and is not moving. Aerospace ground equipment (AGE) and vehicles are considered a permanent obstruction, provided they are parked entirely within a designated area. Areas will be designated by permanent markings such as painted boxes or lines on the ramp or another suitable means. **(T-3)**

4.9.2. When obstruction clearance is doubtful for taxiing, use one or more wing walkers. If wing walkers are unavailable, deplane one or more crewmembers to maintain obstruction clearance and provide marshalling using AFMAN 11-218 signals. Use wing walkers, deplaned crewmembers, or a crewmember on interphone positioned at the paratroop door(s) to act as an

observer while maneuvering on narrow taxiways. During night taxi operations, marshallers will have an illuminated wand in each hand. **(T-3)** Wing walkers are only required to have one illuminated wand. Observers will be in a position to see wing walkers at all times (through door or windows) and communicate with the pilot. **(T-3)**

4.9.3. FOD Avoidance. Make every effort to minimize the potential for engine FOD. **CAUTION:** Prop blast during ground operations is capable of causing extensive damage to other aircraft, flight line equipment, and airport facilities. Crews should:

4.9.3.1. Carefully review airfield layout paying particular attention to taxi routes, turn requirements, and areas for potential FOD. Aircrew should have an airport diagram or airfield depiction (paper or electronic) out for reference, when available, during all taxi operations. (excludes home station or familiar airfields). **(T-3)**

4.9.3.2. Minimize power settings during all taxi operations.

4.9.3.3. Use low speed ground idle whenever possible.

4.9.3.4. Where possible, avoid 180 degree turns. If it becomes necessary to accomplish a 180 degree turn on a narrow runway, the turn should be accomplished at an intersection of a link taxiway or at a designated turn around pad.

4.9.3.5. Where possible, avoid taxi operations that position an engine over an unprepared or un-swept surface. If unavoidable, leave the engine in idle (to the maximum extent possible) until the engine is over an improved surface.

4.9.4. Reverse Taxi. The PIC coordinates reverse taxi directions and signals with the LM and marshaller (when available). Before reverse taxiing, the LM will:

4.9.4.1. Secure all cargo and ensure all passengers are seated. **(T-3)**

4.9.4.2. Open the aft cargo door and lower the ramp to approximately 12-inches above horizontal. **(T-3)**

4.9.4.3. Position themselves on the aircraft ramp to direct reverse taxi and report any hazards. Provide timely interphone instructions on turns, distance remaining, conditions of the maneuvering area, and stopping point. **(T-3)**

4.9.4.4. Stop no less than 25 feet from an obstruction. **(T-3) Exception:** If reverse taxiing to perform multiple COLs, the LM should ensure the aircraft is not offset and directs the aircraft to a stop with the off-loaded pallet no closer than 5 feet from the aft edge of the aircraft tail.

4.9.4.5. With the PIC, ensure the taxi area is sufficiently illuminated during night reverse taxi operations without NVGs. **(T-3)**

4.9.5. After landing and clearing the runway, and with approval of the PIC, the LM may open the aft cargo door and lower the ramp to approximately 12 inches above horizontal to prepare for cargo off/onload provided equipment, cargo, and passengers remain secure in the cargo compartment.

4.9.6. Additional aircraft taxi/taxi obstruction clearance and FOD avoidance information can be found in AFMAN 11-218 and applicable MAJCOM supplements.

4.10. Aircraft Speed. In accordance with AFMAN 11-202V3, this manual, and the applicable flight manual.

4.11. Participation in Aerial Events. See DAFI 11-209, *Participation in Aerial Events*, AFMAN 11-246 Volume 6, *Aircraft Demonstrations (C-17, C-130, KC/NKC-135),* and appropriate MAJCOM supplements/Aerial Demo Concept of Operations (CONOPs).

4.12. Traffic Alerting and Collision Avoidance System (TCAS). It is imperative to follow resolution advisories (RAs) to obtain aircraft separation computed by TCAS. Failure to follow the computed RA may increase the probability of a midair collision. Pilots who deviate from an ATC clearance in response to an RA shall notify ATC of the deviation as soon as practical and promptly return to the ATC clearance when the traffic conflict is resolved or obtain a new clearance. **(T-3)**

4.12.1. TCAS event documentation. The PIC will document all pertinent information surrounding an RA event on an AF Form 651, *Hazardous Air Traffic Report (HATR),* and submit to the nearest Air Force Safety Office. **(T-3)**

4.12.2. The investigating safety office will determine if the event is, in fact, reportable, and will notify the individual or unit submitting the HATR of this determination and/or pending actions. **(T-3)**

4.13. Radar Altimeter.

4.13.1. Any crewmember detecting the illumination of the radar altimeter Low Altitude Warning light will immediately notify the PF. **(T-3)** If terrain can't be visually identified and avoidance ensured, perform the flight manual escape maneuver until the light goes out or terrain clearance is visually assured. **(T-3)**

4.13.2. Before departure, set the radar altimeter for emergency return.

4.13.3. The navigator and pilot will use the same radar altimeter setting unless briefed otherwise. **(T-3)**

4.13.4. Set the radar altimeter to the height above touchdown/height above aerodrome (HAT/HAA) during instrument approaches.

4.14. Buddy and Windmill Taxi Starts. Buddy and windmill taxi starts may be performed when approved by the OG/CC. Compliance with (-1) recommendations are mandatory during training. This authority may be delegated to the squadron or MC when the unit is deployed. This authorization will not be construed to allow repeated buddy or windmill starts at various scheduled enroute stops.**(T-3)** Nonessential crewmembers and all passengers will be loaded after completion of a buddy or windmill taxi start. **(T-3)**

4.15. Reduced Power Operations. HQ AMC/A3V authorizes reduced power operations in accordance with applicable flight manuals. Pilots should normally use reduced power for takeoffs provided refusal speed (Vr) is equal to or greater than takeoff speed. Use normal takeoff power if Vr is less than takeoff speed. **(T-3)**

4.15.1. Reduced power is not authorized for max effort takeoffs. **(T-2)**

4.15.2. Formation leaders will brief takeoff Torque/TIT when different engine variations are in the same formation. **(T-3)**

4.16. Hand-held (HH) GPS for Laptops with Moving Map Display (MMD).

4.16.1. The HH GPS and MMD are designed as a SA tool. The pilot monitoring and navigators are designated the primary users of MMD. PICs may authorize other crewmembers to use the MMD to assist with SA. Falcon View or Joint Mission Planning System (JMPS) are the only AMC approved software for MMD use.

4.16.2. Aircrew members using MMD will immediately discontinue monitoring if safety of flight is inhibited or during any other situation the PIC determines it unsafe to use. **(T-3)**

4.16.3. Do not use HH GPS/MMD for primary navigation. **(T-3)** All chart and fixing requirements are still required. The hand-held GPS will not be used to update navigation equipment (SCNS/INS). **(T-3)**

4.16.4. Only GPS units approved for use with laptop computers will be used. **(T-2)**

Chapter 5

AIRCREW PROCEDURES

Section 5A—Pre-Mission

5.1. Aircrew Uniform.

5.1.1. Aircrew will wear the aircrew uniform, as outlined in DAFI 36-2903, *Dress and Personal Appearance of Air Force Personnel,* and the appropriate MAJCOM supplement, on all missions, unless otherwise authorized. When the Foreign Clearance Guide (FCG) requires civilian attire, dress conservatively. **(T-1)**

5.1.2. OG/CCs will determine clothing and equipment to be worn or carried aboard all flights commensurate with mission, climate, and terrain involved. **(T-3)**

5.1.2.1. See T.O. 14-1-1, *U.S. Air Force Aircrew Flight Equipment Clothing and Equipment*, for authorized aircrew clothing and aircrew flight equipment (AFE) combinations as well as AFMAN 11-202V3 and DAFI 36-2903. All crewmembers will have Nomex gloves in their possession. **(T-3)** Only aircrew boots listed on the Air Force Life Cycle Management Center (AFLCMC) Air Force Safe-to-Fly list are authorized.

5.1.2.2. Crewmembers will remove rings and scarves before performing aircrew duties. **(T-3)**

5.2. Personal Requirements.

5.2.1. Helmets and Oxygen Masks. (N/A for Aeromedical Evacuation (AE crewmembers)). Crewmembers will carry a personal helmet:

5.2.1.1. Anytime parachutes are required to be carried by the mission directive. **(T-3)**

5.2.1.2. Whenever the aircrew requires helmet mounted NVGs. **(T-3)**

5.2.1.3. When required for wear of the aircrew chemical Biological Radiological and Nuclear (ACBRN) equipment. **(T-3)**

5.2.1.4. When required to be mobile in the cargo compartment during airdrop operations. **(T-3)**

5.2.2. Flashlights. Each crewmember must carry an operable flashlight. **(T-3)**

5.2.3. A reflective belt or suitable substitute will be worn on flight lines during hours of darkness or periods of reduced visibility. **(T-3)**

5.2.4. Tool and Airdrop Kits. At least one tool kit will be on board for all missions. **(T-3)** One airdrop kit will also be aboard the aircraft for aerial delivery missions. **(T-3)** Units will identify tool kit contents and inventory procedures in their local supplement. **(T-3)** As a minimum, the tool kit will contain the tools necessary to perform the emergency actions in section 3 of the flight manual and hostile environment repair procedures (HERP). **(T-3)** One NVG aircraft preparation kit will be on board for NVG missions. **(T-3)**

5.2.5. Hostile Environment Repair Kit (HERK). One HERK will be onboard for all Outside the Continental United States (OCONUS) and contingency deployment missions. **(T-3)** The HERK should not be onboard the aircraft for Continental United States (CONUS), OCONUS

based units on missions in the local area, and non-contingency missions. Units will identify where the HERK will be stored on the aircraft in the local supplement to this manual. **(T-3)** The FE will ensure the HERK is onboard and serviceable (sealed) during the aircraft preflight prior to departure. **(T-3)** Additionally, the fight engineer will ensure one-each generator and starter pad is onboard the aircraft for missions requiring the HERK. **(T-3)** The HERK will not be removed from the aircraft until mission completion, and then only by the owning unit. **(T-3)**

5.2.6. NVGs. All crewmembers will preflight and carry their own NVGs for each flight when the mission requires NVGs. **(T-3)** If available, one spare set of NVGs will be carried per crew and will be preflighted by the PIC. **(T-3)** Each crewmember will carry approved spare batteries for their own NVGs. **(T-3)** Both Pilots will wear the same type NVGs. **(T-3)**

5.3. Pre-Mission Actions.

5.3.1. Passenger Restrictions. Release space available seats to the maximum extent possible unless overriding safety, legal or security concerns prohibit space available travelers from flying on specific missions. **(T-3)** The only passengers on missions transporting DVs are those of the official party and those space available passengers authorized by the lead POC for the traveling party. **(T-3)** Authorization must be approved 24 hours in advance. **(T-3)** Any training that will prohibit passengers must be declared prior to mission execution phase to allow planning for downline stations. **(T-3)**

5.3.2. Space Available Passengers. For other than revenue and White House missions, PICs are authorized to release space available seats on mission legs when no official passengers are aboard (positioning and de-positioning legs). Coordinate with C2 agency to release available seats to the passenger terminal. PICs are encouraged to release maximum space available seats subject to the following restrictions:

5.3.2.1. Revenue Missions. These are missions for which the using agency (typically a government agency other than DoD) is reimbursing DoD for use of the aircraft. Space available passengers on revenue missions must be approved 24 hours in advance by USAF Vice Chief of Staff (USAF/CVAM), theater Air Mobility Division (AMD) or Joint Operational Support Airlift Center (JOSAC) (as appropriate) and the using agency contact officer through unit C2 agencies. **(T-0).** This is essential to ensure proper funding and reimbursement. Consult C2 to determine mission revenue status if in doubt. Congressional Delegations (CODEL) are not revenue missions.

5.3.2.2. White House Support Missions. Space available passengers are generally not permitted aboard White House support mission aircraft without express permission of USAF/CVAM. This is normally due to the security status of the aircraft, which may include positioning and de-positioning legs. When it is necessary to move aircrew members or support personnel on White House support mission aircraft, the White House Military Office (WHMO) is advised and permission obtained through the unit C2 and CVAM. On de-positioning legs space available passengers are usually permitted if the aircraft is no longer required to maintain an upgraded security status.

5.3.3. The PIC is responsible for ensuring all passengers receive all required passenger briefings regardless of the category of passenger. **(T-3)**

5.4. Aircrew Publications Requirements. All crewmembers will have in-flight access to the publications specified in **Table 5.1** on all missions .**(T-3)** Aircrew Publications are maintained on the AMC/A3V Publications webpage. Units may specify additional publications in their unit supplement. All crewmembers issued an Electronic Flight Bag (EFB) will ensure it is current and carried on all flights. **(T-3)** Units may establish a process to provide publications onboard the aircraft, but this does not change the EFB requirement for all crewmembers. This process will be described in the unit supplement. **(T-3)** Reference AFI 11-215, *Flight Manuals Program*, for guidance on electronic publications.

Table 5.1. Aircrew Publications.

PUBLICATION	NOTES
Aircraft Flight Manual (-1)	
Aircraft Performance Data (-1-1)	
Aircraft Flight Manual (SCNS -1-4)	
Abbreviated Checklists	A minimum of one paper backup of the abbreviated checklist(s) for each primary crew position will be available on the aircraft. **(T-3)**
T.O. 1C-130-101, *Implementation of C130 Series*	
T.O. 1C-130A-9	
AFMAN 11-202V3	
AFMAN 11-2C-130HV3, C-130H *Operations Procedures*	
AFTTP 3-3.C-130H Combat Mission Guide (minimum of Sections 1 and 2)	
DAFMAN 13-217	
AFMAN 11-231, *Computed Air Release Point Procedures*, (Airdrop-qualified only)	

Section 5B—Predeparture

5.5. Global Decision Scheduling System (GDSS) Account. Pilots will obtain a GDSS account prior to operating on Integrated Flight Management (IFM)-planned sorties. **(T-3)** Download aircrew departure documents using the GDSS account, at locations without an AMC C2 presence. For operational missions, ensure GDSS account passwords are active prior to departing home station.

5.6. Mission Kits. Carry mission kits on all operational missions. **(T-3)** Publications should be maintained on the EFB. Forms may be maintained and carried electronically provided operable inflight viewing and printing capabilities exist.**(T-3)** Suggested items include: **Note:** *Indicates

mandatory for all Air Operations Center (AOC) Tanker Airlift Control Center (TACC) or AMC missions away from home station and as directed by C2 authority.

5.6.1. Publications:

5.6.1.1. *DAFMAN 11-401, *Aviation Management*.

5.6.1.2. DoD Manual 4140.25-M, Volume 2, *DoD Management of Bulk Petroleum Products, Natural Gas, and Coal*, **Chapter 16**.

5.6.1.3. *AFMAN 24-204, *Preparing Hazardous Materials for Military Air Shipments*.

5.6.1.4. *AMCI 11-208, *Mobility Air Forces Management*.

5.6.1.5. *Airfield Suitability and Restrictions Report (ASRR).

5.6.1.6. *AMC Aircrew Border Clearance Guide.

5.6.1.7. *Flight Crew Bulletin (FCB).

5.6.1.8. AFI 11-289, *Phoenix Banner, Silver, Copper Operations*.

5.6.1.9. * AMCI 24-6051 V11, *Cargo and Mail Policy*.

5.6.1.10. *AMCI 90-903, *Aviation Operational Risk Management*.

5.6.1.11. AFTTP Series 3-3.C-130H, *Combat Aircraft Fundamentals*.

5.6.2. Forms:

5.6.2.1. *CBP Form 6059B, *Customs Declaration Form*.

5.6.2.2. DD Form 1748-2, *Airdrop Malfunction Report (Personnel-Cargo).*

5.6.2.3. *DD Form 2131, *Cargo/Passenger Manifest*.

5.6.2.4. *CBP Form 7507, *General Declaration Outward/Inward*.

5.6.2.5. Standard Forms 44, *Purchase Order-Invoice-Voucher*.

5.6.2.6. AF Form 457, *USAF Hazard Report*.

5.6.2.7. *AF Form 651, *Hazardous Air Traffic Report (HATR).*

5.6.2.8. *AFTO Form 781, *Aviation Resource Management System (ARMS) Aircrew/Mission Flight Data Document*.

5.6.2.9. *AF Form 1297, *Temporary Issue Receipt*.

5.6.2.10. AFTO Form 761, *Customer Questionnaire*.

5.6.2.11. *AF Form 4108, *C-130 Fuel Log*.

5.6.2.12. *C-130 Flight Data Worksheet.

5.6.2.13. AMC Form 54, *Aircraft Commander's Report on Services/Facilities.*

5.6.2.14. AF Form 711B, *USAF Mishap Report*.

5.6.2.15. *AMC FM 4031, *Crew Resource Management (CRM)/Threat and Error Management (TEM) Skills Criteria Training/Evaluation.*

5.6.2.16. *AF Form 4075, *Aircraft Load Data Worksheet*.

5.6.2.17. Japanese Customs Service Forms.

5.6.2.18. AMC Form 97, *AMC In-Flight Emergency and Unusual Occurrence Worksheet.*

5.6.2.19. AF Form 853, *Air Force Wildlife Strike Report*.

5.6.2.20. *AMC Aviation Operational Risk Management (AvORM) Worksheet.

5.6.3. Orders:

5.6.3.1. DD Form 1610, *Request and Authorization for TDY Travel of DoD Personnel*.

5.6.3.2. AF Form 1631, *North Atlantic Treaty Organization* (*NATO) Travel Orders* (when required).

5.6.3.3. *AF Form 4327A, *Flight Authorization* (or MAJCOM prescribed according to DAFMAN 11-401*)*.

5.6.4. Miscellaneous:

5.6.4.1. *Box car seals.

5.6.4.2. *Masking tape.

5.7. Flight Plan/Data Verification. The FE will complete TO 1C-130H-1-1 *C-130 Takeoff and Landing Data (TOLD) Card* and *Pilot Information Card*, as specified in **Chapter 9**. (T-2) Pilots and copilots will use the *Pilot Information Card*. (T-2) A qualified pilot, or additional FE, will cross-check the TOLD card for accuracy by using the performance manual or approved tabulated data. (T-2) As a minimum, the person checking the data will:

5.7.1. Verify GW independently from the TOLD card. **(T-2)**

5.7.2. Cross-check air minimum control Vmca (one engine INOP in ground effect), takeoff, and landing speeds. **(T-2)**

5.7.3. Review and compare the computed distances, ground roll, and climb gradient (if applicable) with the actual conditions, runway available, and departure procedures. **(T-2)**

5.8. Departure Planning. Use AFMAN 11-202V3 and the appropriate MAJCOM supplements. Regardless of the type of departure flown (Instrument Flight Rules (IFR)/Visual Flight Rules (VFR)), review the following (as appropriate): IFR Departure Procedure, instrument approach plate, NOTAMS, GDSS2 Giant Report, and suitable terrain charts. The PIC will provide the obstacle height, distance, and gradient information necessary for performance computations to the FE. **(T-2)** All performance data will be computed by the FE and checked by a qualified pilot or another FE using performance manual or approved tabulated data. **(T-2)**

5.8.1. VFR Departures. Reference AFMAN 11-202V3_AMCSUP, VFR Departures.

5.8.2. IFR Departures: Aircrews must use an approved IFR departure method as outlined in AFMAN 11-202V3. **(T-0).**

5.8.3. Critical Field Length. Takeoff GW can never exceed that which would require CFL in excess of the runway available for a normal takeoff. **(T-2)** In some cases, a minimum altitude is required at the published screen height.

5.8.4. Gross Weight (GW). Ensure that the aircraft does not exceed the maximum GW, zero fuel weight, or center of gravity (CG) limitations specified in the aircraft flight manual. **(T-2)**

GW may be further restricted by operating conditions such as, icing, temperature, pressure altitude, runway length and slope, aerodrome weight bearing capacity, departure maneuvering, required climb gradients, and obstacles.

5.9. Weather Minimums for Takeoff. Use **Table 5.2**

Table 5.2. Weather Minimums for Takeoff.

MISSION	VIS	REMARKS
Operational	1000 RVR (305 meters)	When less than RVR 1600, but equal to or greater than RVR 1000, the crew may takeoff if mission priority dictates, provided the runway has dual RVR readouts (touchdown and rollout) and displays (minimum RVR 1000 on both) and runway centerline lighting is operational. For any takeoff below 1600 RVR, the crew must be fully qualified. **(T-2)**
All others	1600 RVR (488 Meters)	For runways with more than one operating RVR readout, it is mandatory the RVR reads a minimum of 1600 on all.
Notes: If no RVR readout is available for the departure runway, visibility must be reported to be 1/2 mile (800 meters). When weather is below approach and landing minimums (ceiling or visibility) a departure alternate is required (See AFMAN 11-202V3_AMCSUP, **paragraph. 5.1.1.2**). **(T-2)**		

5.10. Adverse Weather. The C-130H is a category II aircraft for turbulence. AF produced turbulence products are based upon category II aircraft. If referencing other products or reports, crews should confirm the type of aircraft the forecast turbulence applies to, or what type of aircraft reported the encounter, to gain a more accurate picture for their route of flight. Turbulence category charts are found in the AFH 11-203V2, *Weather for Aircrews – Products and Services*.

Section 5C—Preflight

5.11. Hazard Identification and Mitigation. After the entire crew is assembled at the aircraft, the PIC will brief the primary flight threat(s) facing the crew during takeoff and climb-out and associated threat mitigation plan(s). **(T-3)**

5.12. Aircraft Servicing and Ground Operations.

5.12.1. APU Usage. For fuel conservation, minimize use of APU. Use ground power units when practical.

5.12.2. Aircraft Refueling. Aircrew members certified in ground refueling may perform refueling duties. FEs acting as refueling supervisors and panel operators will comply with T.O. 00-25-172 *Ground Servicing of Aircraft and Static Grounding/Bonding* and refueling job guide. **(T-3)** Aircrews will only refuel in cases when maintenance support is not readily available and the mission would be delayed. **(T-3)** Crewmembers may augment maintenance refueling teams at enroute stops. Units will not refuel to a "standard" ramp load. **(T-3)** The

aircraft will be refueled after the aircraft tail number is assigned and the exact mission-specific fuel requirement is known. **(T-3)** The goal is to provide an accurate fuel requirement before refueling begins to prevent defueling or having a second refueling.

5.12.3. Aircrew T.O. 1C-130XX-1 Preflight Inspection Requirements.

5.12.3.1. The aircrew T.O. 1C-130XX-1 preflight inspection will remain valid until either:

5.12.3.1.1. Aircraft ground time exceeds 12 hours (72 hours provided the aircraft is sealed, not flown, and documented entry control is maintained). **(T-3)**

5.12.3.1.2. Another maintenance preflight is performed. **(T-3)**

5.12.3.2. Aircrew will perform a thorough visual inspection when they assume a preflighted spare or an aircraft not requiring a preflight. **(T-3)** Same day, as referenced from T.O. 1C-130XX-1, is defined as the time period from 0001 to 2359 local.

5.12.4. Fire Protection and Crash Rescue.

5.12.4.1. The aircraft engine fire extinguisher system fulfills the minimum requirements for fire protection during engine start.

5.12.4.2. A fireguard is required for all engine starts including the APU. **(T-3)** A crewmember or ground controller may act as fireguard.

5.12.5. Aircrew and Maintenance Engine Runs.

5.12.5.1. A mixture of aircrew and maintenance personnel will not normally accomplish engine runs. **(T-3)** When an aircrew member is required to start or run up engines for maintenance purposes, the following procedures apply:

5.12.5.1.1. Maintenance personnel will accomplish all necessary inspections and preparations for the engine run. **(T-3)** These actions include but are not limited to: intake/exhaust inspections, access panel security servicing, and AFTO Form 781 documentation.

5.12.5.1.2. Use the pilot, FE, and LM checklists. Begin with the "cockpit checklist," and complete all appropriate checklists through the "before leaving the airplane" checklist. **(T-3)**

5.12.5.1.3. Operate symmetrical engines when power settings above ground idle are required. **(T-3)**

5.12.5.2. Only deviate from the flight crew checklist when maintenance requires less than four engines to be started. **(T-3)**

5.12.6. Towing. Aircrew members normally do not participate in towing operations. If required to occupy cockpit positions during towing operations conducted by personnel not familiar with C-130 towing procedures, the PIC will coordinate with the senior maintenance officer or superintendent to ensure the towing supervisor and crew are qualified. **(T-3)** At non-USAF installations, the PIC must have approval from the airfield operations officer or manager prior to towing. **(T-3)** The PIC will ensure the tow team supervisor briefs all personnel on their duties and the associated hazards. **(T-3)** Proper checklists will be used. **(T-3)** If any doubt exists as to the qualification of tow team personnel or the safety of the operation, make

no attempt to tow the aircraft until qualified Air Force personnel can be located. Under no circumstances will any crewmember act as the towing supervisor. **(T-3)**

5.12.7. Aircrew members are prohibited from climbing onto the upper fuselage or wing surfaces unless there is an operational necessity. When operational conditions dictate that aircrew members must climb onto upper fuselage or wing surfaces (without active or passive fall protection), they will do so only when conditions are dry, lightning is not observed within 10 NM, and wind speed is below 20 knots. **(T-3)** Consider use of additional ground members, if available, to assist in identifying hazardous conditions (e.g., approaching inclement weather). Additional information can be found in the Job Safety Analysis (JSA) – *C-130 Aircrew Fall Protection*, located on the AMC/A3V_Publications_C130 SharePoint site: **https://cs2.eis.af.mil/sites/12679/Aircrew%20Pubs%20Library/Forms/Better.aspx?RootFolder=%2Fsites%2F12679%2FAircrew%20Pubs%20Library%2FMaster%5FLibrary%5FVerified&FolderCTID=0x01200021370D19BF5D9F459D8FD907C237955A&View={701BF038-D3D9-416D-BBEC-BF178FBE44E9}** ACs will ensure no other personnel (excluding qualified ops/maintenance personnel) have access to, or be allowed to, climb onto the fuselage or wings. **(T-3)**

5.13. Aircraft Recovery Away from Main Operating Base (MOB). Refer to **Chapter 9** for procedures.

5.14. Aircrew Flight Equipment Requirements.

5.14.1. Life preserver units (LPUs). LPUs will be placed within easy reach of each passenger and aircrew member before takeoff on overwater flights. **(T-2)** Crewmembers will fit and adjust LPUs (if applicable) for overwater flights and will wear them on overwater missions below 2,000 feet. **(T-3)** **Exception:** LPUs need not be worn for takeoffs, landings, or approaches. Ensure the appropriate number and type of life preservers are aboard for overwater missions carrying children and infants.

5.14.2. Parachutes:

5.14.2.1. Personnel performing duties near an open (or suspected open) door/hatch/ramp in-flight will be restrained by a safety harness, or wear a parachute. **(T-2)**

5.14.2.2. All crewmembers will preflight/pre-position parachutes for ready access in case of bailout during contingency missions with hostilities and/or hazardous functional/acceptance check flights. **(T-3)** LMs will wear a restraining harness instead of a parachute during airdrops below 800 feet AGL or when performing duties near an open exit above 25,000 feet MSL. **(T-2)**

5.15. Oxygen and Oxygen Mask Requirements. Aircrew members will comply with the oxygen requirements in AFMAN 11-202V3. **(T-1)**

5.15.1. Oxygen. Oxygen on board for takeoff must be sufficient to accomplish the planned flight from the equal time point (ETP) to a suitable recovery airfield, should oxygen be required (minimum 5 liters for all flights). **(T-3)** Calculate crew requirements using the Oxygen Duration Chart or Tab Data in the flight manual, regulator setting 100% and altitude 10,000 feet.

5.15.1.1. Since the C-130H flight deck can accommodate more crewmembers than there are oxygen regulators, all C-130H aircraft will have three emergency passenger oxygen

systems (EPOS), or protective breathing equipment (PBE) permanently pre-positioned on the aircraft. **(T-3)** The EPOS/PBEs may be stored on the overhead storage rack when not required on the flight deck.

5.15.1.2. On missions carrying passengers/patients, one EPOS per passenger/patient will be available regardless of planned flight altitude. **(T-3)** EPOS will be distributed or placed throughout the cabin/cargo area in accordance with AFMAN11-2C-130HV3ADDA, *C-130 Operations Configurations/Mission Planning*. **(T-3)**

5.15.1.3. Do not remove the LM's emergency equipment (cargo compartment quick dons) for use by flight deck crewmembers.

5.15.1.4. Crewmembers occupying a crew station will have an oxygen mask with communication connected and readily available for use from before engine start until engine shutdown. **(T-2)**

5.15.1.5. Crewmembers that do not have access to the aircraft oxygen system will have an EPOS or PBE within arm's reach for flights above 10,000 feet. **(T-2)**

5.15.1.6. Normally, unpressurized flight will not be planned above 20,000 feet cabin altitude (except certain airdrop missions). **(T-3)** Aircrews required to fly unpressurized missions above 20,000 feet MSL will pre-breathe 100 percent oxygen in accordance with **Chapter 15**. **(T-2)**

5.15.2. MA-1 Portable Oxygen Bottles.

5.15.2.1. There are three types of A-21 regulators on MA-1 portable oxygen bottles, unmodified, modified and modified2. Except for fill times, operation of the bottles are identical. Refill valve type is determined by viewing the inside of the fill nozzle and/or identaplate as specified below:

5.15.2.1.1. Unmodified: Refill valves have a push valve inside the nozzle resembling a standard tire valve stem.

5.15.2.1.2. Modified: Refill valves have a brass plate/filter covering inside of the nozzle and no valve stem is visible.

5.15.2.1.3. Modified2 (Fast Fill): Refill valves have a brass plate/filter covering inside of the nozzle and no valve stem is visible. Part number on the identaplate is one of the following: 9010A4, 9010A5, 9010A6, 9010A7, 3260007-0201, 3260007-0103.

5.15.2.2. Ensure a minimum of two unmodified/modified2 bottles are installed on the aircraft, one in the cargo compartment and the other in the pilot position. **(T-2)** Additional unmodified/modified2 bottles should be installed in the cargo compartment first.

5.15.2.2.1. Home Station Departures. A waiver to the minimum number of required unmodified/modified2 bottles may be granted on a case-by-case basis. (See **paragraph 3.3**)

5.15.2.2.2. Enroute Departures. Maintain minimum number of unmodified/modified2. If unable, continue until reaching a location with replacement bottle(s).

5.16. NVG Departures.

5.16.1. NVG Departure Weather Minimums. Weather minimums for NVG departures for pilots who are non-current and/or unqualified will adhere to VFR minimums in accordance with AFMAN 11-202V3. **(T-1)** Weather minimums for NVG departures for current and qualified aircrews are no different than normal takeoffs.

5.16.2. NVG Malfunctions During Takeoff. During an NVG takeoff, if the PF experiences NVG failure, the takeoff may be continued at the discretion of the PIC. The PM will be ready to immediately assume aircraft control if the PF experiences spatial disorientation or an NVG malfunction. **(T-3)** See AFTTP 3-3.C-130H for additional NVG emergency information.

Section 5D—Enroute

5.17. Flight Progress. In-flight, use all available navigational aids to monitor SCNS/GPS/INS performance. Immediately report malfunctions or any loss of navigation capability that degrades centerline accuracy to the controlling air route traffic control center (ARTCC). Use the following procedures for flight progress:

5.17.1. Before an oceanic flight, plot the oceanic portion on an appropriate chart. Annotate the chart with the mission number and date. If practical, charts may be reused. Refer to **Chapter 8** for chart requirements.

5.17.2. Another pilot or navigator will verify waypoint data inserted into the SCNS/INS. **(T-3)** Check both the coordinate information and the distances between waypoints against the flight plan.

5.17.3. Class II Routes (formerly known as Category I Routes). Maintaining SA during Class II routes is essential to the safe conduct of the flight. SA includes, but is not limited to, positional awareness and accurate fuel updates. This requires due diligence on the part of all aircrew members.

5.17.3.1. When approaching each waypoint on a Class II route, the PM will recheck coordinates for the next two waypoints. **(T-3)**

5.17.3.2. Navigators will use the procedures in **Chapter 8** for flight following. **(T-2)**

5.17.4. See **Chapter 8** for more enroute navigation procedures.

5.18. Weather (WX) Forecasts. It is the pilot's responsibility to obtain destination weather prior to descent. The primary sources are 618 AOC (TACC) weather operations, Operational Weather Squadrons (OWS), and USAF weather flights via pilot-to-meteorologist service (PMSV) or through a USAF aeronautical station. For aircraft flying in EUCOM AOR (Europe, North Africa and Middle East operations) contact United States Air Forces Europe (USAFE)/OWS at Sembach AB GE. SOUTHCOM AOR contact 612 SPTS/WX at Davis-Monthan AFB, AZ. PACOM AOR contact 17 OWS at Joint Base Pearl Harbor-Hickam, HI. The ATC system can provide weather information to enroute aircraft.

Section 5E—Arrival

5.19. Descent. Night and Marginal Weather Operations. Fly a precision approach, if available, at night or during marginal weather. If a precision approach is not available, fly any available

approved instrument approach. A visual approach may be flown during night VFR conditions if an approved instrument approach to the landing runway is not available or operational missions require a tactical approach. **Note:** For VFR or visual approaches at locations other than home station, an ILS glide slope indicator or a visual glide slope indicator (e.g., Vertical Approach Slope Indicator (VASI), Precision Approach Path Indicator (PAPI), or SCNS glide slope is required. **(T-2)**

5.20. Instrument Approach Procedures.

5.20.1. Aircraft category. The C-130H is a category "C" aircraft. If approach speeds exceed 140 knots, the minimums for category "D" will be used. **(T-2)**

5.20.2. Prior to starting an instrument approach, pilots will confirm their aircraft can comply with the missed approach climb gradient requirements established in AFMAN 11-202V3. **(T-1)**

5.20.3. Weather minimums. Before starting an instrument approach, or beginning an enroute descent, pilots will confirm the existing weather is reported to be:

5.20.3.1. At or above required visibility for straight-in or sidestep .1approaches. **(T-1)**

5.20.3.2. At or above required ceiling and visibility for circling approaches. **(T-1)** For circling approaches with no published ceiling requirement, the required ceiling shall be computed by taking the published HAA plus 100 feet rounded up to the next one hundred foot value. **(T-2)** For example, if the HAA is 747 feet, add 100 feet to get 847 feet and then round up to the next one hundred foot value which would be 900 feet. A mandatory ceiling of 900 feet or above is needed for the approach. When circling minimums are published, but not by category, circling approach minimums are as published, but in no case lower than 600 feet and 2 miles visibility.

5.20.3.3. Increase the published visibility minimums of an instrument approach by ½ or as noted in NOTAMs, on Automated Terminal Information Service (ATIS), or on the approach plate, when the runway approach lighting system (ALS) is INOP. (This applies only to the ALS itself, not to VASIs, PAPIs, and other lights that are not a component of the ALS.)

5.20.3.4. For PAR approaches, Decision Altitude (DA) and visibility will be no lower than 200 feet HAT and RVR 2400 (730 meters) or 1/2 mile visibility (800 meters) with no RVR readout available.

5.20.4. Flight Instrumentation Requirements.

5.20.4.1. If full flight instrumentation is not available and operational, aircraft are limited to a DA/ Minimum Descent Altitude (MDA) based on a HAT of 300 feet and RVR 4000, or ¾ mile visibility (1220 meters) with no RVR.

5.20.4.2. Category I ILS. Full flight instrumentation consists of: dual flight displays (one flight director plus ADI repeat), complete differential pressure instruments, heading/compass systems, and attitude indicators in the pilot and copilot positions.

5.20.4.3. Full flight instrumentation for a precision approach radar (PAR) consists of: complete differential pressure instruments, heading/compass systems, and attitude indicators in the pilot and copilot positions.

5.20.5. Category I ILS Procedures. Decision altitude for precision approaches will be as published, but no lower than 200 feet HAT. **(T-2)**

5.20.5.1. ILS Precision Runway Monitor (PRM) Approaches. Both pilots must be certified to conduct an ILS PRM approach. **(T-0)** Comply with the following operational procedures:

5.20.5.1.1. See AFMAN 11-202V3 for specifics on flying PRM approaches.

5.20.5.1.2. The approach must be briefed as an ILS/PRM approach. **(T-2)**

5.20.5.1.3. Pilots must reference the PRM Attention All Users Page (AAUP) for specific PRM guidance at a given location. **(T-2)**

5.20.5.1.4. All breakouts from the approach shall be hand flown. **(T-3)** Autopilots shall be disengaged when a breakout is directed. **(T-3)**

5.20.5.1.5. Should a TCAS Resolution Advisory (RA) be received, the pilot shall immediately respond to the RA. **(T-2)** If following an RA requires deviating from an ATC clearance, the pilot shall advise ATC as soon as practical. **(T-3)** While following an RA, comply with the turn portion of the ATC breakout instruction unless the pilot determines safety to be a factor.

5.20.6. Non-Directional Beacon (NDB) Procedures. NDB approaches may be flown during day, night, or IMC conditions after compliance with any airfield restrictions in GDSS and the ASRR. Back up each approach with available navaids/GPS to include loading the NDB coordinates in SCNS.

5.20.7. C-130H aircrews are not authorized to fly RNAV (RNP) approaches until aircraft navigation equipment is upgraded/certified, aircrews are trained, and MAJCOM/A3 has issued operational approval. (e.g., RNP, RNP AR, RNAV (RNP), RNAV (GPS). **(T-1)**

5.20.8. After Beginning Descent or Approach. If the reported weather decreases below minimums after starting a descent, receiving radar vectors for an approach, or established on any segment of an approach prior to the Missed Approach Point (MAP), the approach may be continued to the MAP and either execute a missed approach or continue to land if conditions permit. Reference AFMAN 11-202V3.

5.20.8.1. Do not continue the approach below minimums unless the runway environment is in sight and the aircraft is in a position to make a safe landing.

5.20.8.2. If the approach is continued, sufficient fuel must be available to complete the approach and missed approach, and proceed to a suitable alternate with normal fuel reserve. **(T-2)**

5.20.8.3. The PIC has final responsibility for determining when the destination is below designated minimums, and for initiating proper clearance request.

5.20.9. Holding. An aircraft may hold at a destination that is below landing minimums, but forecast to improve to or above minimums provided:

5.20.9.1. The aircraft has more fuel remaining than that required to fly to the alternate and hold for the appropriate holding time, and the weather at the alternate is forecast to remain at or above alternate filing minimums for the period, including the holding time.

5.20.9.2. Destination weather is forecast to be at or above minimums before excess fuel will be consumed.

5.21. NVG Approach and Landing.

5.21.1. NVG Approach Weather Minimums. Weather minimums for NVG visual approaches, NVG visual pattern work, and pilots who are non-current and/or unqualified will adhere to VFR minimums in accordance with AFMAN 11-202V3. **(T-2)** Current and qualified NVG aircrews may fly IFR approaches with weather at approach minimums.

5.21.2. NVG Malfunction during Approach and Landing. If one of the pilots experiences NVG failure on short final, it will be at the discretion of the PIC to transition to normal lights or perform a go-around. The PM will be ready to immediately assume aircraft control if the PF experiences spatial disorientation or an NVG malfunction. **(T-2)** See AFTTP 3-3.C-130H for additional NVG emergency information.

Section 5F—Miscellaneous

5.22. Cockpit Voice Recorder (CVR). If involved in a mishap or incident, after landing and terminating the emergency, pull the CVR and DFDR power circuit breakers. This procedure keeps the CVR from recording over itself and retains the DFDR data. **Note:** Some series of the C-130H also contain the FLT/VOICE RECORDER – INHIBIT circuit breaker. If this circuit breaker is pulled, the CVR and DFDR will continue operating with external AC power applied to the aircraft.

5.23. Data link. If a data link system is used and the aircraft is involved in a mishap or incident, after landing and terminating the emergency, extract and store all mission data for a minimum of 90 days to aid in mishap investigations. **(T-2)**

5.24. Anti-Exposure Suits. Missions scheduled to conduct operations north of 78 degrees and south of 60 degrees latitude are required to carry anti-exposure suits for all crewmembers. **(T-2)**

5.25. Cockpit Congestion and Loose Objects.

5.25.1. Limit personnel on the flight deck to the minimum commensurate with the mission requirements. At no time will this exceed seven. **(T-3)**

5.25.2. No items (checklists, charts, etc.) will be placed behind the condition levers or on the throttle quadrant during critical phases of flight. **(T-2)**

5.25.3. Place only soft items on the top bunk. **(T-3)**

5.26. Ordnance Procedures. Conduct the following procedures after the live firing of chaff/flares or the crew suspects aircraft battle damage:

5.26.1. After landing, taxi to the de-arm area or another suitable safe location to check for hung ordnance.

5.26.2. A qualified crewmember will deplane the aircraft and check all chaff/flare dispensers for hung ordnance or damage. **(T-3)** **Note:** ALE-47 flare squibs that fail to fire are not considered hung ordnance.

5.26.3. If hung ordnance is found, identified by a protruding or partially ejected flare cartridge, the aircraft will remain in a de-arm area until Explosive Ordnance Disposal (EOD) personnel

meet the aircraft. **(T-3)** The aircraft must remain in the designated safe area until EOD personnel can clear all hung ordnance. **(T-3)**

Chapter 6

AIRCRAFT SECURITY

6.1. General. This chapter provides guidance on aircraft security and preventing and resisting aircraft piracy (hijacking) of the C-130H aircraft. AFI 13-207-O, *Preventing and Resisting Aircraft Piracy (Hijacking)*, DAFI 31-101, *Integrated Defense* (CUI), and specific MAJCOM security publications contain additional guidance. Aircrews will not release information concerning hijacking attempts or identify armed aircrew members or missions to the public. **(T-0)**

6.2. Security. The C-130H is a "Protection Level 3" resource. Aircraft security at non-U.S. military installations is the responsibility of the controlling agency.

6.3. Integrated Defense. The following security procedures implement AFI 31-101, requirements for C-130H aircraft:

6.3.1. The aircraft will be parked in an established restricted area and afforded protection in accordance with DAFI 31-101. **(T-3)**

6.3.2. When no permanent or established restricted area parking space is available, establish a temporary restricted area consisting of a raised rope barrier, and post with restricted area signs. **(T-3)** Portable security lighting will be provided during the hours of darkness if sufficient permanent lighting is not available. **(T-3)** Post security forces in accordance with DAFI 31-101. **(T-3)**

6.3.3. At non- U.S. military installations, the PIC determines the adequacy of local security capabilities to provide aircraft security commensurate with this chapter. If the PIC determines security to be inadequate, the aircraft will depart to a station where adequate security is available. **(T-3)**

6.3.4. The security force must be made aware of all visits to the aircraft.**(T-3)** The security force POC must be identified to the PIC. **(T-3)**

6.3.5. Security support is a continual requirement and is not negated by the presence of aircrew or ground crewmembers. Security force support terminates only after the aircraft doors are closed and the aircraft taxis.

6.3.6. Locking and Sealing. Lock or seal the aircraft during a "Remain Over Night" (RON) on non-secure ramps.

Chapter 7

TRAINING AND OPERATING LIMITATIONS

7.1. Passengers on Training Missions.

7.1.1. Passengers are not authorized during initial qualification or re-qualification training (N/A with MEP). **(T-2)**

7.1.2. Mission qualification/certification training, evaluations, off station trainers, and JA/ATTs may carry passengers only if the pilot in training has met basic aircraft qualification requirements per AFMAN 11-2C-130HV1, and any unqualified NAV, FE, or LM is under the direct supervision of an instructor. **(T-2)**

7.1.3. Multiple practice approaches, touch-and-go landings, stop-and-go landings, simulated emergency training, and airdrops are prohibited with passengers on board. **(T-2) Exception:** Personnel scheduled to jump following a heavy/CDS airdrop, safeties, Mission Essential Personnel (MEP) (defined in DAFMAN 11-401), exercise participants that will be offloaded by "airland" procedures following the airdrop, or any personnel authorized by the JA/ATT tasking order may be transported on airdrop training missions. Nonparticipants in the exercise, OST, or JA/ATT are prohibited. **(T-2)**

7.1.4. Reference DAFMAN 11-401 MAJCOM SUP for additional restrictions.

7.2. Touch-and-go Landing Limitations.

7.2.1. Ground idle touch-and-go landings may be performed by any pilot from any seat with direct IP/EP supervision.

7.2.2. Minimum runway length for 50% flap flight idle touch-and-go landings is 5,000 feet. Minimum runway length for all other touch-and-go landings is 6,000 feet.

7.2.3. Minimum ceiling/visibility: 300 feet and RVR 4000 (3/4 SM visibility) with an IP, 600 foot ceiling and 2 miles visibility for touch-and-go certified ACs. **(T-3)**

7.2.4. Only authorized when crosswind component corrected for RCR is within the recommended zone for the landing crosswind chart.

7.2.5. Do not accomplish touch-and-go landings on slush covered runways. **(T-3)**

7.2.6. Authorized when normal wake turbulence criterion is met.

7.2.7. Do not perform a no-flap ground idle touch-and-go landing. **(T-3)**

7.2.8. Touch-and-go landings may be performed with cargo onboard provided the PIC and LM determine suitability of the cargo. Pilots shall not fly touch-and-go landings with airdrop-configured cargo (with the intent to drop).**(T-3) Exception:** Touch-and-go landings are authorized with Air Force unilateral loads provided the loadmaster visually confirms the bundles/platforms still meet the after loading inspection requirements prior to being airdropped. Touch-and-go landings are authorized with MEP on board. Touch-and-go landings with hazardous cargo onboard are prohibited. **(T-3)**

7.2.9. Cargo security is checked prior to the first touch-and-go and thereafter at an interval determined by the PIC (should not exceed 1 hour). PICs must allow additional time required for this inspection. **(T-3)**

7.2.10. Include type of touch-and-go as part of the landing briefing (e.g., ground-idle or flight-idle). **(T-3)**

7.3. Simulated Emergency Flight Procedures.

7.3.1. Simulated emergency flight procedures will be conducted in accordance with AFMAN 11-202V3, AFMAN 11-202V3_AMCSUP and this manual. **(T-1)**

7.3.1.1. The PIC or IP will alert all crewmembers prior to practicing emergency procedures. **(T-3)**

7.3.1.2. In an actual emergency, terminate all training. Training will be resumed only when the PIC determines it is safe. **(T-3)**

7.3.1.3. Practice emergencies that require simulating an engine shutdown, placing switches in other the their normal position, or an abnormal configuration, only during training, evaluation, or currency flights when an instructor or flight examiner pilot is in one of the pilot seats. Preface all simulated emergencies with the word "simulated" and terminate simulated emergencies when an actual emergency arises. Do not conduct aircraft system emergency procedures training during any tactical training (operating in low level environment or during tactical approaches). **(T-3)**

7.3.2. Simulated Engine Failure Limitations. **(T-3)**

7.3.2.1. Do not simulate failure of two engines in flight. **(T-3)**

7.3.2.2. Direct IP supervision required. **(T-3)**

7.3.2.3. Do not simulate engine failure below Vmca (one engine INOP, out of ground effect) and not less than 300 feet AGL. Set the torque on the simulated failed engine to zero to 1,000 for T-56A-15 aircraft and flight idle for T-56A-15A aircraft and add four (4) knots to the charted Vmca speeds. **(T-3)**

7.3.2.4. Simulated engine-out no-flap landings are restricted to AC upgrades and above. **(T-3)**

7.3.2.5. Planned go-around from simulated engine-out no-flap approaches are not authorized. **(T-3)**

7.3.2.6. Required go-around from simulated engine-out no-flap approaches require setting the flaps to 50% and using all four engines.

7.3.2.7. Do not compound engine-out circling approaches with any other simulated malfunctions. **(T-3)**

7.3.2.8. Weather Minimums. Crosswind component must be within the recommended zone of the landing crosswind chart. **(T-3)**

7.3.2.8.1. Day IMC – at or above circling minimums for the approach being flown (600/2 if none published). **(T-3)**

7.3.2.8.2. Night – 1,000 feet ceiling and 2 statute miles visibility or circling minimums for the approach being flown, whichever is higher. **(T-3)**

7.4. Flight Maneuvers.

7.4.1. Practice of the following maneuvers is prohibited in flight: **(T-1)**

7.4.1.1. Full stalls. **(T-1)**

7.4.1.2. Unusual attitudes. **(T-1)**

7.4.1.3. Simulated hydraulic system loss by turning engine driven hydraulic pumps off. **(T-1)**

7.4.1.4. Rudder force reversal/spins. **(T-1)**

7.4.1.5. Simulated runaway trim malfunctions. **(T-1)**

7.4.1.6. Simulated 2-Engine approaches/landings. **(T-1)**

7.4.1.7. Simulated engine-out takeoffs. **(T-1)**

7.4.2. Permissible in-flight maneuvers. The maneuvers listed below are authorized for qualification and continuation training (or formal upgrade training where indicated). They are applicable to all C-130H aircraft except when prohibited or restricted by the flight manual or other applicable directives. The pilot or IP will alert all crewmembers before accomplishing the following: **(T-3)**

7.4.2.1. Approach to Stalls: Direct IP supervision required. Authorized during formal upgrade training in day VMC at a minimum of 10,000 feet above the ground or 5,000 feet above the cloud deck, whichever is higher. **(T-3)**

7.4.2.2. Instrument Steep Turns: Authorized during daylight VMC with up to 60-degrees bank. Restricted to 5,000 feet AGL or cloud deck for bank angles in excess of 45-degrees. Check stall speed prior to making instrument steep turns. **(T-3)**

7.4.2.3. Slow Flight: Direct IP supervision required. Authorized at or above 5,000 feet AGL. Fly at approach, threshold, and 1.2 power off stall speed with gear down and flaps 0%, 50%, or 100%. Do not exceed 15-degrees of bank. **(T-3)**

7.5. Briefing Requirements.

7.5.1. Training/Evaluation Briefing. Before all training/evaluation missions, instructor/flight examiners will brief the crew on requirements and objectives for each student or examinee. **(T-3)**

7.5.2. Debriefing. Review and evaluate overall training performed. Each student or aircrew member should understand thoroughly what training has been accomplished. Ensure all training is documented.

7.5.3. The PIC will use approved MAF and MDS-specific debrief guides. **(T-3)**

7.6. Simulated Instrument Flight. Artificial vision restricting devices are not authorized for any phase of flight.**(T-3)** Simulated instrument flight may be flown and logged without the use of a vision-restricting device.

7.7. Operating Limitations.

7.7.1. Unless specifically authorized elsewhere, do not practice emergency procedures that degrade aircraft performance or flight control capabilities. **(T-3)**

7.7.2. In an actual emergency, terminate all training and flight maneuvers practice. **(T-3)**

7.7.3. Planned Go-Arounds and Visual Low Approaches. Initiate a planned go-around or missed approach not later than:

7.7.3.1. Precision approach – DA (or 200 feet HAT, whichever is higher). **(T-3)**

7.7.3.2. Non-precision approach – Missed Approach Point (MAP). **(T-3)**

7.7.3.3. Visual Approach or VFR pattern – 200 feet AGL for simulated emergencies (no minimum for non-emergency). **(T-3)**

7.7.3.4. Restricted Low Approach (aircraft, equipment, or personnel are on the runway) – 500 feet AGL. **(T-3)**

7.8. Landing Limitations.

7.8.1. No-Flap Landing Limitations:

7.8.1.1. Direct IP supervision required. **(T-3)**

7.8.1.2. Do not combine no-flap circling approaches with any other simulated emergencies. **(T-3)**

7.8.1.3. Maximum GW is 120,000 lbs. **(T-3)**

7.8.1.4. Crosswind component must be within the recommended zone on the crosswind chart. **(T-3)**

7.8.1.5. Authorized in daylight IMC if the weather is at or above circling minimums and at night with weather at or above 1,000 foot ceiling and 2 SM visibility or circling minimums whichever is higher. **(T-3)**

7.8.1.6. Use 50% flaps for a go-around.**(T-3) Note:** Check no-flap landing distance with runway available.

7.8.2. Stop-and-Go Landing Criteria:

7.8.2.1. Authorized only on designated training or evaluation missions. **(T-3)**

7.8.2.2. Authorized to be performed by any C-130H qualified pilot.

7.8.2.3. Runway remaining for takeoff must be greater than or equal to CFL. **(T-3)**

7.8.2.4. Crosswind component corrected for RCR must be in the recommended zone of the landing crosswind chart. **(T-3)**

7.8.2.5. Ceiling and visibility must be at least 300 feet and ¾ mile (RVR 4000). **(T-3)**

7.8.2.6. Do not perform stop-and-go landings:

7.8.2.6.1. In conjunction with no-flap landings. **(T-3)**

7.8.2.6.2. When normal wake turbulence criterion is not met. **(T-3)**

7.8.3. Max effort landing limitations and brake cooling procedures (this applies to all brake systems). A lack of consideration for the heat generated in the wheel brakes can result in fused or hot brakes leading to possible tire explosion or fire. Crews are reminded to review the flight manual regarding use of wheel brakes and hot weather procedures. During training, follow the procedures below while conducting multiple max effort landings using partial brake landing criteria: **(T-3)**

7.8.3.1. Outside ambient air temperatures of < 35° Celsius. Crews will not perform more than three consecutive max effort landings without an approximate 15 minute airborne gear down brake cooling period (e.g., VFR pattern to either a touch-and-go or a low approach). **(T-3)**

7.8.3.2. Outside ambient air temperatures of > 35° Celsius. Crews will not perform more than two consecutive max effort landings without an approximate 15 minute airborne gear down brake cooling period (e.g., VFR pattern to either a touch-and-go or a low approach). **(T-3)**

7.8.3.3. Crews should not terminate or conduct operations requiring extended brake applications (e.g., ERO, seat swap) following a max effort or no-flap landing. On normal landings, crews should consider extending rollout to minimize the use of the brakes.

7.8.3.4. After performing a series of two max-effort landings, crews should perform one additional 10 minute airborne gear-down brake cooling period (e.g., VFR pattern to either a touch-and-go or a low approach) before raising the landing gear to prevent a buildup of heat in the brake and wheel assembly. If hot brakes are suspected, follow the flight manual procedures and do not set the parking brake, but chock the nose wheel prior to ground evacuation/engine shutdown.

7.8.3.5. If conducting a series of full antiskid braked or partially braked landings, no tailwind factor is permissible.

7.9. Actual Engine Shutdown and Airstart. Direct IP supervision required. One engine may be shutdown at no lower than 2,500 feet AGL or MSA (whichever is higher) in daylight VMC. **(T-3)**

7.10. Windmill Taxi Start. Direct IP supervision required. Authorized during daylight. Crosswind component must be within the recommended zone of the flight manual takeoff crosswind chart. **(T-3)** Runway must be dry, hard-surfaced, and at least 147 feet wide. **(T-3)** Requires OG/CC approval.

7.11. Aborted Normal Takeoff. Direct IP supervision required. Authorized during formal upgrade training in daylight. Crosswind component must be within the recommended zone of the takeoff crosswind chart. **(T-3)** Runway must be dry, hard-surfaced, and long enough to allow refusal and takeoff speeds to be equal. **(T-3)** Initiate the abort by stating "REJECT" before refusal speed. Do not practice aborts from touch-and-go landings. Do not shut down an engine due to simulated malfunctions.

7.12. Aborted Maximum Effort Takeoff. Direct IP supervision required. Authorized for AC upgrades and above during formal upgrade training. Restricted to the main runway during daylight. Crosswind component must be within the recommended zone of the takeoff crosswind chart. **(T-3)** Runway must be dry, hard-surfaced, 147 feet wide and long enough to allow refusal and takeoff speeds to be equal. **(T-3)** Simulate a runway length less than CFL. Initiate the abort by stating "REJECT" at or below a refusal speed based on simulated runway length. Compare the distance traveled to runway length and point out the ramifications of operating with less than CFL. Cool brakes between aborted takeoffs. Do not shut down an engine due to simulated malfunctions. Do not practice aborted max effort takeoffs from stop-and-go landings. Requires OG/CC approval.

7.13. Maximum Effort Takeoff. ACs may accomplish maximum effort takeoffs. Maximum effort takeoffs should be performed from the main runway when it is available (e.g., safe and practical to taxi from an assault landing zone (ALZ)). Takeoff at Vmeto is not authorized (N/A for operational). **(T-3)**

7.14. Night Vision Goggle (NVG) Training. Crews will accomplish aircrew training according to AFMAN 11-2C-130HV1 and MAJCOM approved training guides before performing NVG operations. **(T-3)**

7.14.1. NVG touch-and-go landings are authorized. Pilots who are both touch-and-go certified and NVG Airland certified may perform NVG touch-and-go landings. **WARNING:** Crews must be thoroughly familiar with the visual cues required to identify the amount of runway remaining when performing touch-and-go operations. **(T-3)**

7.14.2. Ground Operations Training. NVG combat offloads and ground maneuvering are approved. Lights will be kept to a minimum during all NVG operations. **(T-3)** Blacked out (no-light) operations in the cargo compartment are not authorized. **(T-3)**

7.14.3. Runway lighting will be in accordance with DAFMAN 13-217. **(T-1)**

7.15. Training Flight Restrictions. Use **Table 7.1**.

Table 7.1. Training Flight Restrictions.

Maneuver	Altitude	Remarks
Instrument Missed/Low Approaches	MDA/DA	Initiate practice instrument missed approaches no lower than the minimum altitude for the type of approach executed. **(T-3)**
Visual Low Approach/Planned Go Around	200 Feet for simulated emergencies. **(T-3)** No minimum for non-emergency.	
Men and Equipment on the runway	Initiate above 500 feet AGL. **(T-3)**	
Simulated Engine Failure		Direct IP supervision required. Prohibited during tactical operations. **(T-3)** Do not simulate engine failure below Vmca (one engine INOP, out of ground effect) and not less than 300 feet AGL.**(T-3)** Set the torque on the simulated failed engine to zero to 1,000 and add four (4) knots to the charted speed.

		Authorized day IMC if WX at or above circling minimums or night if WX is at or above 1,000 foot ceiling and 2 SM visibility. **(T-3)** Crosswind component must be in the recommended zone.**(T-3)** Engine out no-flap landings are restricted to ACs and above, and planned go-arounds are not authorized. **(T-3)** Engine out circling approaches will not be compounded with any other simulated malfunctions. **(T-3)**
No-Flap Landing		Direct IP supervision required. No-flap circling approaches will not be combined with any other simulated emergencies. **(T-3)** Max GW is 120,000 lbs. and crosswind component must be within the recommended range.**(T-3)** Authorized in day IMC if WX is at or above circling minimums, and at night with WX or 1,000 foot ceilings and 2 SM visibility or circling minimum, whichever is higher. **(T-3)**
Touch-and-Go Landings		Ground idle touch-and-go landings may be performed by any pilot from any seat with direct IP/EP supervision. No-flap ground idle touch-and-go landings not authorized. **(T-3)** Minimum runway length: flaps 50 percent, 5,000 feet – for all other, 6,000 feet. **(T-3)** Crosswind component corrected for RCR is within recommended zone. **(T-3)** Minimum ceiling of 600 feet and minimum visibility of 2 SM (300-feet and RVR 4000 (3/4 SM visibility) if an IP is in either seat). **(T-3)**
Stop-and-Go Landings		Authorized only on designated training or evaluation missions. **(T-3)** Authorized to be performed by any C-130H qualified pilot. Runway remaining for takeoff must be equal to or greater than limiting CFL. **(T-3)** Crosswind component corrected for RCR must be in recommended zone of the landing crosswind chart. **(T-3)** Ceiling and visibility

		must be at least 300-feet and ¾ mile (RVR 4000). **(T-3)**
Slow Flight Demonstration	At or above 5,000 feet AGL. **(T-3)**	Direct IP supervision required. Fly at approach, threshold, and 1.2 power off stall speed with gear down and flaps 0%, 50%, or 100%. **(T-3)** Do not exceed 15-degrees of bank. **(T-3)**
Approach to Stalls	At or above 10,000 feet AGL or 5,000 feet above the cloud deck. **(T-3)**	Direct IP supervision required. Authorized during formal upgrade training Day VMC.
Steep Turns	5,000 feet AGL for bank angles in excess of 45-degrees. **(T-3)**	Not applicable during tactical maneuvers. Authorized during day VMC with up to 60-degrees of bank. Review stall speeds before performing turns.

Chapter 8

NAVIGATION PROCEDURES

8.1. Navigation Databases / Flight Plan / Data verification.

8.1.1. The PIC and navigator will jointly verify routing, altitude, and fuel load prior to departure. **(T-3)** On flight managed sorties, the PIC and navigator will review the flight plan provided by the FM.**(T-3)** Any disagreements/discrepancies/requests for change will be coordinated with the FM.**(T-3)** Navigator crew changes (engine running crew change or augmented crews) will include, as a minimum, a briefing on equipment and fuel status. **(T-3)**

8.1.2. When practical, plan the most direct routing possible or utilize wind optimized Computerized Flight Plan (CFP) routing to enhance fuel conservation.

8.1.3. A MAJCOM-approved CFP, AF Form 70, *Pilot's Flight Plan and Flight Log*, or AF Form 4116, *C-130 Navigator Flight Plan and Log,* is required for all flights except local area training flights with an established standard procedure. **(T-3)** A copy of the navigator's flight plan will be provided to the copilot to verify routing and aid in position reporting. **(T-3)**

8.1.4. A fuel plan is required for all flights except routine local area training flights where the fuel requirement has been verified. **(T-2)**

8.1.5. The navigator will sign in the indicated block on AF Form 4116, Section II, *Fuel/ETP Planning* to certify accuracy of all entries. **(T-3)** Any entries not required for a particular mission on the AF Form 4116 may be left blank.

8.2. Master Flight Plan / Plotting Chart.

8.2.1. Flight Planning. General instructions for completion of AF Form 4116 are provided in this section. MAJCOM-approved computer flight and fuel plans may be used as a substitute for those sections of the AF Form 4116.

8.2.1.1. The AF Form 4116 was developed to provide a tool for all possible missions of the C-130H. Most missions will not require all sections of the Form. In the interest of conservation navigators are encouraged to print and use those sections of the AF Form 4116 required for their respective mission.

8.2.1.2. Most entries on the AF Form 4116 are self-explanatory or explained below.

8.2.1.2.1. HIGHEST ACC FL – Highest Acceptable FL. This altitude is obtained from the appropriate aircraft performance manual.

8.2.1.2.2. WPT – Waypoint. Use this column to indicate the number of each waypoint as entered in the aircraft computer.

8.2.1.2.3. A/B – Ahead or Behind. Compare ETA based on the original flight plan to Actual Time of Arrival (ATA) at each waypoint. Record the difference in this column. If the flight plan changes in-flight, non-applicable ATA spaces may be left blank.

8.2.1.3. When an alternate destination is required, use a flight planning line to indicate, as a minimum, the name of the alternate and the time, course, and distance to the alternate.

8.2.1.4. Aircrews may use any MAJCOM approved mission planning system (MPS) e.g., Advanced Computer Flight Plan (ACFP), Portable Flight Planning Software (PFPS), Joint

Mission Planning Software (JMPS). On a flight managed sortie, the FM uses AMC certified ACFP to create the CFP.

8.2.2. **Equal Time Point Computations.** During mission planning for all oceanic sectors, aircrews are required to calculate an ETP. **(T-2)** Use the worksheet on the AF Form 4116, Section II to calculate the time to the ETP.

8.2.2.1. First Suitable Airfield (FSAF) and Last Suitable Airfield (LSAF) are used in the ETP calculation. These are represented as the First Nearest and the Last Nearest airports in the ETP calculation. They are airports closest to the coast out and coast in waypoints that meet applicable destination alternate requirements except weather. Forecast weather conditions for FSAF/LSAF (ETA +/- 1 hour) will meet or exceed minimums for the lowest compatible approach or 500/1, whichever is greater. **(T-2)** ACFP plans to arrive overhead at the recovery location with 0+45 minutes reserve fuel.

8.2.2.2. Log procedures are required on Class II (formerly known as Category I) routes or Class II portions of routes when the total time between the last suitable airfield (LSAF) and the FSAF is 3-hours or more.**(T-3)** (see **Figure 8.1**).

8.2.2.3. Re-compute ETP in-flight when the ATA at a reporting point is 15 minutes or more ahead or behind the planned time if the change was caused by erroneous wind information.

8.2.2.4. Oxygen Requirement. When an ETP is required calculate the oxygen requirement use “T” time and 10,000 feet with the regulator set to 100% oxygen for all crewmembers. Include any augmented, or MEP as crewmembers. Use the “Duration of Oxygen Supply” chart in the applicable T.O. 1C-130XX-1.

8.2.2.5. Additional guidance on calculating an ETP can be found on the AMC/A3V SharePoint in the Pubs section under Miscellaneous Documents and Illustrations.

8.2.3. Charts. The navigator will flight follow on all missions using a suitable plotting chart (JNC, JNCA, OPC, or GNC). **(T-3)** On missions that do not require plotting fixes, for SA only, navigators may use a moving map in lieu of printing charts.

8.2.3.1. Show the following items on the chart:

8.2.3.1.1. Flight plan course line and waypoints (if not pre-labeled) will be annotated with waypoint number, identifier, radial and distance measuring equipment (DME), or latitude (LAT) and longitude (LONG). **(T-3)**

8.2.3.1.2. Annotate suitable emergency airfields. Optimum emergency airfields are located within 50 NM of the intended route. Refer to the GDSS/ASRR for suitability.

8.2.3.1.3. Portions of Air Defense Identification Zones (ADIZ)/FIR boundaries (if not depicted accurately) pertinent to the route will be annotated. **(T-3)**.

8.2.3.1.4. Annotate the approximate location of the ETP.

8.2.3.1.5. Chart variation (VAR) lines should be updated to the most current available variation. See **paragraph 8.8.2.2** for where to find up-to-date magnetic variation.

8.2.3.2. Plot each fix or position along with the time at that position. Use standard symbols from AFPAM 11-216, *Air Navigation*.

8.2.3.3. In the interest of conservation, flight charts for high level missions may be reused whenever such reuse would not affect plotting accuracy of fixes or position determination.

8.2.3.4. MPS produced "Lambert-Conformal" charts may be used.

8.2.3.5. On approach or departure, the navigator will monitor the aircraft position using an appropriately scaled chart (ONC, TPC, JOG). **(T-3)** Use the NGA approved terrain data, host nation chart, or the most current USAF approved chart updating data tool to update charts within 10-NM of the approach, departure, emergency and divert bases for airfields without a DoD or an approved Jeppesen approach plate. MPS generated charts with updated overlays fulfill this requirement.

8.2.3.6. The navigator will use all available navigational aids (including aircraft radar) to keep the aircraft clear of all terrain and obstructions. **(T-3)**.

8.3. Navigation Capability / Airspace Requirements.

8.3.1. In addition to reviewing DoD FLIP AP/2, all aircrews planning to operate in Atlantic Oceanic airspace will conduct a detailed review of the NAT-HLA airspace operations manual and review the associated FIR Oceanic NOTAMS. **(T-2)** In the event that conflicting information is discovered between FLIP and the NAT-HLA manual, the NAT-HLA manual takes precedence. **Note:** Airspace and associated navigational aid equipment capability are rapidly evolving. Pilots must maintain an in depth knowledge or current requirements/policies. **(T-3)** Aircraft that lose required equipment prior to oceanic airspace will return to the nearest maintenance facility. **(T-2)**

8.3.2. Special certification airspace requirements and procedures. Airspace where performance based navigation (PBN) is applied, will be considered special certification airspace. Types of PBN special certification airspace include North Atlantic High Level Airspace (NAT-HLA), RVSM, Required Navigation Performance (RNP), Area Navigation (RNAV) and Basic-Area Navigation (B-RNAV) airspace. Pilots will immediately notify ATC of any equipment failures that could affect the aircraft's ability to maintain navigation accuracy, after entry into PBN special certification airspace. **(T-3)** The pilot will state their intentions, coordinate a plan of action and obtain a revised ATC clearance. **(T-2)** Document in the aircraft forms any malfunctions or failures of PBN required equipment. **(T-2)** **Note:** The C-130H aircraft is approved for certain PBN operations but requires a qualified navigator at the navigator's station and must be operating with at least one fully operational INU with autopilot engaged. **(T-2)**

8.3.2.1. The C-130H navigation system is certified for RNP-10 and B-RNAV airspace, but with operational time restrictions based on the aircraft navigation equipment. **Note:** These certifications are contingent on receiving a medium accuracy alignment of the INU and operating with at least one fully operational INU with autopilot engaged.

8.3.2.1.1. RNP-10 (Also known as RNAV-10). RNP-10 is defined as RNAV that meets a track keeping accuracy equal to or better than +/- 10 NM for 95% of the flight time. RNP-10 is applicable to oceanic and remote area operations only.

8.3.2.1.1.1. C-130H aircraft may operate up to 6.2 hours (after entering the NAV mode in SCNS) of flight in RNP-10 airspace without an update. If an automatic update is made, the aircraft may continue for an additional 5.7 hours in RNP-10

airspace after the update is complete.

8.3.2.1.1.2. If a manual update is made, the aircraft may continue for an additional 5.2 hours in RNP-10 airspace after the update is complete. Manual updates may be accomplished using the radar or by updating the I-INS and I-DOP solutions using the GPS if a Figure Of Merit (FOM) of 3 or better is indicated.

8.3.2.1.2. B-RNAV (Also known as RNP-5/RNAV-5). B-RNAV is defined as RNAV that meets a track keeping accuracy equal to or better than +/- 5 NM for 95% of the flight time. B-RNAV is used for airways in the Middle East, South American, and European regions designated as either B-RNAV, RNP-5, or RNAV-5 airspace. **Note:** The PBN airspace in the U.S. National Airspace (NAS) is either RNAV-2 (enroute) or RNAV-1 (terminal); C-130H aircraft cannot file/fly RNAV routes (Q- and T-routes) in the NAS. **Exception:** The C-130H may only file/fly GPS Point-to-Point and over-water RNAV routes (Q-routes in the Gulf of Mexico, Caribbean and Alaskan airspace) in the NAS. C-130H aircraft may operate up to 7.0 hours (after entering the NAV mode in SCNS) of flight in B-RNAV airspace without an update.

8.3.2.2. Use of Laptop Computers during Flight. Certified laptop computers with automated flight planning software are approved for in-flight use in accordance with AFMAN 11-202V3. Portable automated flight planning systems, to include moving map capability, are intended to enhance aircrew situational awareness. Consequently, independent GPS-fed laptop computers, which do not fall under the category of CNS/ATM avionic systems, will not be considered RNAV equipment for IFR enroute or terminal navigation, regardless if the required navigation performance (RNP) value of that airspace can be maintained.

8.3.2.3. PICs will ensure that aircraft RNAV capabilities are correctly annotated on filed flight plans in accordance with FLIP GP. **(T-2)** As a minimum, include the following:

8.3.2.3.1. In Block 10 of the DD Form 1801 *International Flight Plan*, include the letters “R” and “S” to indicate PBN capable and standard nav/com equipment available.

8.3.2.3.2. In Block 18 of the DD Form 1801 include:

8.3.2.3.2.1. "PBN/A1B1" to indicate RNP-10 (RNAV-10) and B-RNAV (RNAV-5 (all permitted sensors)) capable.

8.3.2.3.2.2. "NAV/RNVE99" and “RMK/PTP TCAS” to indicate RNAV Point-to-Point capable but not RNAV-1 or RNAV-2 capable.

8.4. Enroute / Flight Progress.

8.4.1. The navigator will monitor the primary command radio unless directed to do otherwise. **(T-3)** The navigator will record ATC clearances and monitor the read back.**(T-3)** This will normally include all ATC instructions involving departure, enroute, and approach procedures. This procedure is not applicable when ATC instructions require immediate execution by the pilot, or when such action interferes with the timely performance of other time-sensitive navigator duties.

8.4.2. On Class II routes, when the time between the LSAF and FSAF is 3-hours or more, the following procedures are required: ETP calculations, and in-flight fuel management. **(T-3)**

8.4.3. On Class II routes or route segments of 3-hours or longer, maintain a flight log and comply with the following procedures:

8.4.3.1. Fix: Time between fix/Computer position/Most Probable Position (MPP) plots will not exceed 1 hour. **(T-3) Note:** Malfunctions or loss of navigational capability, which degrade course centerline accuracy, will be reported immediately to ATC. **(T-2)** See **paragraph 8.6** for further details.

8.4.3.2. Headings: Compute heading deviation for each compass system as soon as practical after initial level-off or coast-out. Use the procedures in **paragraph 8.8**.

8.5. Laptop Computers. Laptop computers running MPS moving map software and connected to a HH GPS provide invaluable SA. Laptop computers and HH GPS must be approved for unrestricted use in flight in accordance with AFMAN 11-202V3. **(T-2)**

8.5.1. Navigators should carry a USAF approved laptop on all missions.

8.5.2. HH GPS units should be connected and the MPS Moving Map Display should be operating.

8.5.3. Laptop computers with HH GPS MPS moving map displays will not be used as the primary source of navigation. **(T-2)**

8.5.4. If involved in a mishap or incident save and store all Mission Planning Laptop computer mission data for a minimum of 90 days to aid in mishap investigations.

8.6. Flight Records. Flight progress will be recorded for Class II routes of 3-hours or longer.**(T-3)** Units may publish local standards for log procedures in the unit supplement. See **Figure 8.2 thru Figure 8.6** for an example of a completed AF Form 4116. The procedures below are general in nature and designed to accommodate a wide range of C-130H navigation equipment configurations.

8.6.1. Standard Log Procedures. The AF Form 4116 consists of planning and in-flight progress data. It will be completed in sufficient detail to fully evaluate or reconstruct the flight. **(T-3)**

8.6.1.1. AF Form 4116, Section I, FLIGHT DATA will be completed when a CFP or CFPS flight plan is not available on Class II routes. **(T-3)**

8.6.1.2. As soon as practical after level-off or coast-out, whichever occurs latest, navigators will verify aircraft position with a coast-out fix, utilizing navigation aid(s) and/or radar. **(T-2)**

8.6.1.2.1. Record the fix on AF Form 4116, Section VIII, RADAR/NAVAID DATA and plot on the chart.

8.6.1.2.2. At the time of the fix, record the primary navigation solution and corresponding deltas (or Lat/Long) for all other navigation solutions on AF Form 4116, Section VI, FIX/COMPUTER POSITION. Plot the primary computer position corresponding to the fix time on the chart.

8.6.1.2.3. At the time of the fix, record as a minimum (on AF Form 4116, Section IX, IN-FLIGHT DATA); Greenwich Mean Time (GMT), position symbol, spot w/v, drift angle (DA), HDG (either True Heading (TH), Compass Heading (CH), or Grid Heading

(GH)), TAS, Ground Speed (GS), ETA to the next waypoint, and Altitude (ALT). This data may be annotated all on the fix line, or partly on the fix line and partly under the spot readings/remarks area, just as long as all the items are recorded.

8.6.1.3. After coast-out, every 30 minutes, record (on AF Form 4116, Section VI, FIX/COMPUTER POSITION) the primary navigation solution and the corresponding deltas (or Lat/Long) for all other navigation solutions.

8.6.1.4. Plot the primary navigation solution every hour or within 10 minutes of crossing a reporting point, whichever occurs first. For all plotted primary navigation solutions, record (on AF Form 4116, Section IX, IN-FLIGHT DATA); GMT, position symbol, spot w/v, DA, HDG (either TH, CH or GH), TAS, GS, ETA to the next waypoint, and ALT. This data may be annotated all on the fix line or partly on the fix line and partly under to spot readings/remarks area, just as long as all items are recorded. Additionally, record (in Section VI, FIX/COMPUTER POSITION) the primary navigation solution and corresponding deltas (or Lat/Long) for all other navigation solutions.

8.6.1.5. Between recorded positions, monitor instruments and record spot readings, as required, to allow for calculating a DR in the event full log procedures become required. Record spot readings at regular intervals to allow for calculating a DR in the event of a navigation system failure. Spot readings are recommended with unplanned HDG/DA changes of 4 degrees and/or unplanned GS/TAS changes of 10 knots occur. Spot readings should include time, HDG, (TH, CH, or GH), DA, GS, spot W/V and TAS.

8.6.1.6. As soon as practical prior to coast-in, navigators will verify aircraft position with a coast-in fix utilizing navigation aid(s) and/or radar. **(T-2)**

8.6.2. Full Log Procedures. In the event of a navigation system failure in excess of 15 minutes full log procedures will be implemented (e.g., “Inertial Navigation Unit (INU) FAIL”, “GPS FAIL”, or “GPS NAV FAIL”). **(T-2)** Full log procedures include a Dead Reckoning (DR) substantiation/fix/computer position line, and an alter heading line for each recorded and plotted position. If the navigation system failure is resolved, the navigator may resume log procedures as outlined in **paragraph 8.6.1**. **Note:** For LC-130H aircraft, an alter heading line is not required if full log procedures are being used for a reason other than a navigation system failure.

8.6.2.1. From the last plotted position, compute a DR for the next position. A DR associated with the fix/MPP will be plotted on the chart prior to plotting the fix/MPP. **(T-3)** As a minimum, record the following on AF Form 4116, Section IX, IN-FLIGHT DATA; GMT of the DR, position symbol, averaged GS, time interval, averaged HDG (TH, CH or GH), and averaged DA. Use elapsed time and averaged GS to compute total ground distance (DIST). Work right to left from the average HDG (TH, CH or GH) to obtain the True or Grid Course (TC or GC). Plot the DR using TC or GC and ground distance.

8.6.2.2. Plot a fix/computer position/MPP at least once per hour or within 10 minutes of crossing a reporting point, whichever occurs first.

8.6.2.2.1. At the time of the fix/computer position/MPP, record the primary navigation solution and corresponding deltas (or lat/long) for all other navigation solutions on AF Form 4116, Section VI, FIX/COMPUTER POSITION. Plot the primary computer position corresponding to the fix time on the chart.

8.6.2.2.2. At the time of the fix record, as a minimum (on AF Form 4116, Section IX, IN-FLIGHT DATA); GMT, position symbol, spot w/v, DA, HDG (TH, CH or GH), TAS, and GS. This data may be annotated all on the fix line, or partly on the fix line and partly under the spot readings/remarks area, just as long as all items are recorded.

8.6.2.3. Between recorded positions, monitor instruments and record spot readings, as required, to allow for calculating a DR.

8.6.2.3.1. Record spot readings at regular intervals to allow for calculating a DR in the event of a navigation system failure. Spot readings are recommended with unplanned HDG/DA changes of 4 degrees and/or unplanned GS/TAS changes of 10 knots occur. Spot readings should include time, HDG, (TH, CH, or GH), DA, GS, spot W/V and TAS.

8.6.2.3.2. In the event where both the INU and the GPS fail, as a minimum, record spot readings at regular intervals, when changes of 2 degrees or more in HDG or DA occur, or when GS or TAS changes by 5 knots or more. Spot readings should include: time, HDG (TH, CH or GH), DA, GS, spot w/v and TAS.

8.6.2.4. On the alter heading (A/H) line; record the GMT, action (A/H), TC, DA, GS, ETA to next 2 waypoints, and work left to right to obtain a compass heading. Use best known or calculated DA and GS.

8.6.2.5. As soon as practical prior to coast-in, navigators will verify aircraft position by either navigation aid fix and/or radar fix. **(T-2)**

8.7. Celestial Procedures. See AFPAM 11-216 *Air Navigation,* for a comprehensive discussion of celestial concepts.

8.8. Heading Deviation Check Procedures.

8.8.1. On Class II routes or route segments of 3-hours or longer, heading deviation for each compass system will be computed in Section V of AF Form 4116 as soon as practical after initial level-off or coast-out. **(T-2)** Compute and record the deviation (DEV) for all compass systems (mid-time celestial heading checks may be recorded in the Section X). **Note:** The AF Form 4116 Section V deviation check format solves for "deviation" for all heading reference systems not for "correction."

8.8.1.1. Heading deviation checks are not required on Dual INU equipped aircraft, Class I routes and tactical routes. A deviation check is not required on Class II routes of less than 3 hours if the aircraft is equipped with 2 or more operable heading systems (the standby compass is not considered a system for this requirement), and the difference between systems does not exceed 2-degrees.

8.8.1.2. Compass deviation is not necessarily constant over time or after significant course changes. Navigators will reconfirm deviation on Class II legs every 3 hours or after planned course changes of greater than 30-degrees. **(T-2)**

8.8.1.3. Dual INU equipped aircraft should consider doing a whiskey compass deviation check. In the event of a total SCNS failure, this deviation check correction would be beneficial in plotting an accurate DR.

8.8.2. INU/SCNS Heading Checks. Record and compare the INU/SCNS true heading with all compass systems.

8.8.2.1. To compute the compass deviation check, take the INU true heading and apply the most up-to-date magnetic variation available for the current location, compare that solution to the C-12 compass systems and the whisky compass. Use the resulting DEV to determine most accurate compass and use that DEV on AF Form 4116, Section IX, IN-FLIGHT DATA.

8.8.2.2. The navigator should input compass "correction" into SCNS on class II routes or route segments of 3 hours or longer. An accurate SCNS correction is computed by comparing the INU mag heading to the headings shown on the BICU input page for compass 1 and 2. Reverse the sign of the calculated "deviation" from AF Form 4116, Section V, DEVIATION CHECK to determine the "correction" to input into SCNS to correct the SCNS I-DOP solution. See **Figure 8.7**.

8.8.3. In order to obtain an accurate celestial heading check, the exact Azimuth Angle (ZN) must be derived.**(T-3)** Exact ZN is obtained by interpolating using exact longitude, latitude, declination, and Local Hour Angle (LHA). ZN may also be derived from SCNS immediate page and the subpoint of the celestial body used for the heading check.

8.9. In-flight Fuel Management Procedures.

8.9.1. Record the fuel readings listed below at level-off time and regular time intervals (coinciding with entries on aircraft performance record), not to exceed 1-hour and 30-minutes. **(T-2)** Use Section VII, IN-FLIGHT FUEL MANAGEMENT of the AF Form 4116 to complete in-flight fuel management computations.

8.9.1.1. ETA DESTINATION. Best known arrival time at destination.

8.9.1.2. TIME. Time of the fuel reading.

8.9.1.3. TERMINAL FUEL FLOW. Taken from the ENROUTE FUEL COMPUTATION WORKSHEET, AF Form 4116, Section II, FUEL/ETP PLANNING.

8.9.1.4. CURRENT FUEL FLOW.

8.9.1.5. AVERAGE FUEL FLOW. Calculate by adding terminal fuel flow to current fuel flow and dividing the sum by 2.

8.9.1.6. FUEL REMAINING. Fuel quantity at time of calculation. In the interest of safety, use the lower of the calculated or gauge fuels.

8.9.1.7. MINIMUM DIVERT/REQUIRED OVERHEAD DESTINATION FUEL (MIN DIV/REQ OVHD DEST). Required overhead fuel (item 12 of AF Form 4116, Section II, FUEL/ETP PLANNING).

8.9.1.8. USABLE FUEL. Subtract MIN DIV/REQ OVHD DEST from FUEL REMANING.

8.9.1.9. FUEL ETE. Calculated using formula in **paragraph 8.10.2.3**.

8.9.1.10. ETE DESTINATION. Subtract TIME from ETA DESTINATION.

8.9.1.11. EXTRA TIME. Subtract ETE DESTINATION from FUEL ETE. Report this value to the pilot. If this is a negative value, check the computation and values for errors. If they are correct, evaluate the destination options.

8.9.2. Use the following formulas to accomplish in-flight fuel management:

8.9.2.1. [(TERMINAL FUEL FLOW + CURRENT FUEL FLOW)] / 2 = AVERAGE FUEL FLOW.

8.9.2.2. FUEL REMAINING – (MIN DIV/REQ OVHD DEST) = USABLE FUEL.

8.9.2.3. USABLE FUEL / AVERAGE FUEL FLOW = FUEL ETE.

8.9.2.4. FUEL ETE – ETE DESTINATION = EXTRA TIME.

8.9.3. AF Form 4125, *Range Control Chart* may be used for in-flight fuel management. Manual construction **(Figure 8.8**) is as follows:

8.9.3.1. "POINT NUMBER" represents the approximate level-off point (initial cruise altitude), 25, 50, 75, and 100 percent of the flight plan distance as indicated on AF Form 4116 or CFP.

8.9.3.2. To compute Column A, "ENROUTE FUEL."

8.9.3.3. Record in Block 1 (L/O) the AF Form 4116, Section II, FUEL/ETP PLANNING, Block 7 TOTAL TAKEOFF Fuel.

8.9.3.4. Divide the AF Form 4116, Section II, FUEL/ETP PLANNING, Block 1 ENROUTE Fuel by 4 and record that number in each -25% Enroute block. Optionally, a more accurate method is to compute the fuel at each point and subtract them to obtain the enroute fuel burn between each point. Put this number in the corresponding -25% Enroute block. This method takes into account the initial higher burn rates.

8.9.3.5. Subtract this number going down the chart to obtain the enroute fuel at each point. (e.g., 1. L/O -25% Enroute Block = 2 (25%) ENROUTE fuel).

8.9.3.6. The destination block will be TOTAL TAKEOFF fuel minus the full ENROUTE fuel.

8.9.3.7. To compute Column B, "MINIMUM FUEL."

8.9.3.8. Record in Block 5 DEST (100%) the AF Form 4116, Section II, FUEL/ETP PLANNING, Block 12 MIN DIV/REQ OVHD DEST.

8.9.3.9. Divide the AF Form 4116, Section II, FUEL/ETP PLANNING, Block 1 ENROUTE Fuel by 4 and record that number in each -25% Enroute block. Optionally, a more accurate method is to compute the fuel at each point and subtract them to obtain the enroute fuel burn between each point. Put this number in the corresponding -25% Enroute block. This method takes into account the initial higher burn rates.

8.9.3.10. Add this number going up the chart to obtain the minimum fuel at each point. (e.g., 5. Dest + 25% Enroute Block = 4 (75%) min fuel).

8.9.3.11. This fuel is the minimum, at each given point, to fly from that point to destination with sufficient fuel to make a missed approach (if required), continue to the destination alternate, hold, make the planned approach, and land with 4,000 lbs. of fuel. Minimum

fuel will also include any identified extra fuel needed overhead the alternate (e.g., excess holding, for succeeding legs).

8.9.3.12. Column C. "DISTANCE": The flight plan distance for the given points listed in **paragraph 8.10.3.1**, obtained from AF Form 4116. This can be graphically depicted as either distance flown or distance remaining.

8.9.3.13. "DISTANCE FLOWN/REMAINING": Label the nautical miles to the destination along the horizontal scale. For distance flown, start with 0 at the left and allow the major blocks to represent convenient increments of mileage. The distance scale should be expanded to the maximum to give as large a presentation as possible.

8.9.3.14. Draw a vertical line on the graph representing total distance to destination and label this line with the destination name. If required, plot vertical lines representing ETPs at the appropriate distance flown/remaining.

8.9.3.15. Estimated Performance Line. Estimated performance is based on planned fuel at T/O, level off, and arrival plotted column A versus distance in column C. The difference between the estimated performance line and the minimum arrival line is contingency and identified extra fuel.

8.9.3.16. Minimum Arrival Fuel Lines. A "minimum arrival" line will be constructed by plotting fuel in column B versus distance in column C.

8.10. Self-Contained Approaches (SCA) – Airborne Radar Approach (ARA) Procedures.

8.10.1. IFR Operations. In accordance with AFMAN 11-202V3, SCAs or ARAs are approved for IMC when developed by Terminal Instrument Procedures (TERPS) authority and approved for use by the MAJCOM.

8.10.1.1. When unable to develop a procedure in accordance with AFMAN 11-230, *Instrument Procedures*, by a TERPS authority, see AFMAN 11-202V3. Crews are only authorized to perform ARAs in IMC with an approach validated by TERPS authority. **(T-1)**

8.10.1.2. Weather minimums will be established by the approach, but will be no lower than 500-feet and 1-mile or 300-feet and 1-mile for a computer ARA. **(T-3)**

8.10.2. VFR Operations. Units will construct VFR ARA approaches with the guidance below, but not less restrictive than AFMAN 11-230. **(T-2)** VFR minimums will be in accordance with AFMAN 11-202V3. **(T-2)**

8.10.2.1. Minimum Safe Altitude. The MSA will be calculated using either the Iron Cross or Concentric Circles as defined in AFTTP 3-3.C-130H.**(T-3)** The MSA is calculated per **paragraph 12.4.1.5** within 10 NM, and the MSA will be used by the FE for a missed approach. **(T-3)**. The MSA can be found quickly with FalconView Route Elevation Profile.

8.10.2.2. Required Obstruction Clearance (ROC). A Trapezoid will be created to the approach corridor with 2 NM left and right of centerline at the approach end, and it will extend 5 NM left or right to 10 NM from the approach end. **(T-3)** Inside this trapezoid, the ROC will be 300 feet AGL clearance of all obstacles in this area (man-made or terrain) for the decent altitudes per NM created in the ARA.**(T-3)** If needed, the planner may use the

option to angle the approach up to 15-degrees either side of centerline to facilitate a 300 feet/NM rate of descent. See **Figure 8.8** and **Figure 8.9**.

8.10.2.3. Missed Approach Point (MAP). The MAP should be 1 NM from the threshold and 300 feet above the Touchdown Zone Elevation (TDZE), but it may be adjusted as required for mission accomplishment. See **Figure 8.9**.

8.10.2.4. Missed Approach. During planning, the planners and aircrew should look at the Missed Approach Obstacle Clearance for the possibility of a missed approach. This process is taking a trapezoid corridor from the MAP to 15 NM from the MAP. At the MAP, the width is 2 NM left/right, and it is a trapezoid that is 6 NM left/right at 15 NM. The planner should assume 200 feet/NM for a climb out and assure the aircraft can clear all obstacles. MAJCOM/A3 may authorize the subtraction of 48 ft/NM if operationally necessary. See **Figure 8.10**.

8.10.2.5. Published VFR ARA Approaches. Units will submit locally used VFR ARA approach plates for approval to OGV. **(T-3)** Publish approved VFR ARA approaches in local supplements. The local supplement should include SCNS LZ input data. If available, pilots will back up the navigator using a published instrument approach. **(T-3)**

8.10.3. Planning and Coordination. Prior to entering the terminal area, the navigator will utilize the T.O. 1C-130XX-1CL-3 Descent Checklist, ARA Brief, to coordinate with the PF. **(T-3)**

8.10.4. Terminology and Procedures.

8.10.4.1. Pattern Control. The navigator will advise the PF when positive radar identification of the airfield complex is made. **(T-3)**

8.10.4.2. The navigator will direct the aircraft by headings to the final approach course. **(T-3)** When flying computer ARAs, navigators, after verifying/updating the SCNS solution with an Offset Aim Point (OAP) on the radar may advise the PF to intercept the bank steering bar (as required).

8.10.4.3. During the approach, the navigator should advise the PF of the drift and groundspeed. If PFs can view this information on the selected SCNS/INS display, this advisory is not required.

8.10.4.4. The turn onto base leg (if required) should be made to allow for a 10 NM final (or as required).

8.10.4.5. The navigator will state the distance from touchdown each NM from the end of the runway beginning 10-NMs out from the touchdown zone, until the MAP. **(T-3)** A glide path warning should be given 10 seconds prior to the begin descent point.

8.10.4.6. The navigator will give heading information at least every NM during the final approach, beginning 10-NMs out from the touchdown zone, until the MAP. **(T-3)** For RVAD equipped aircraft and certified crews, when flying computer ARAs, navigators will advise the PF of their SCNS course centerline deviation (with radar OAP verification), at least every NM during the final approach. **(T-3)**

8.10.4.7. Use AFMAN 11-202V3_AMCSUP procedures for required non-precision approach calls upon reaching the MDA.

8.10.4.8. Computer ARAs are authorized in VMC or IMC according to **paragraph 8.10.1** and **paragraph 8.10.2** One OAP will be active on the radar until the field is called in sight or a missed approach is executed. **(T-3)**

8.11. Grid Procedures.

8.11.1. Definitions and formulas. See AFPAM 11-216.

8.11.2. Grid Log. The navigator will use page 6 of the AF Form 4116 when grid navigation procedures are required.**(T-3)** Block entries are as follows:

8.11.2.1. TIME. Time of celestial heading/system heading observation.

8.11.2.2. TH. Observed/computed true heading.

8.11.2.3. LONG/CA. Enter +W –E longitude (polar chart) or convergence angle (CA).

8.11.2.4. GH. Observed/computed grid heading.

8.11.2.5. GYRO #1, GYRO #2. On aircraft equipped with two independent gyro stabilized systems with numbers corresponding to aircraft systems (e.g., C-12 No. 1, N-1 No. 2), circled number denotes the primary steering gyro. On aircraft whose systems are not numbered or do not correspond to the aircraft system, identify the primary steering gyro in "REMARKS."

8.11.2.6. GR. Gyro reading. Record the reading from the primary compass.

8.11.2.7. PREC. The amount of precession since the last heading shot (period precession): GH – GR = PREC.

8.11.2.8. RATE/CUM. The hourly precession rate based upon the precession indicated at the time of observation. Precession rate is derived from the period precession and the applicable elapsed time period (since the last compass reset). **Example:** 2-degrees precession in 40 minutes equals a 3-degree/hour precession rate. This entry is required only when period precession is greater than one degree. The cumulative portion of the block is used for tracking the cumulative precession rate once a false latitude has been set.

8.11.2.9. LAT. The mid-latitude between the current observation and the next proposed observation.

8.11.2.10. FALSE LAT. The False Latitude setting being used to eliminate precession. This entry is required only when a False Latitude setting is used.

8.11.2.11. RESET. Whenever a gyro is reset, place a check mark in this block.

8.11.2.12. GC. Measured grid course to the next checkpoint.

8.11.2.13. DRIFT. The number of degrees (+ or -) of drift.

8.11.2.14. DGH (Desired grid heading). Apply anticipated drift to GC.

8.11.2.15. RT/2 CORR. See formula on the bottom of the AF Form 4116.

8.11.2.16. IGH (Initial grid heading). Used for alter heading.

8.11.2.17. GRID ENTRY. Apply grivation (GRIV) to magnetic heading (MH) to obtain desired grid heading (DGH); or apply longitude (LONG) or convergence angle (CA) to true heading (TH) to obtain DGH. See formulas on the AF Form 4116.

8.11.2.18. GRID EXIT. Apply GRIV to DGH to obtain MH; or apply LONG or CA to DGH to obtain TH. See formulas on the AF Form 4116.

8.11.3. Grid Celestial Computations.

8.11.3.1. When plotting celestial lines of position in grid reference, apply longitude (polar chart) or convergence angle to the true azimuth and plot the grid azimuth.

8.11.3.2. When taking heading checks at high latitudes, it is advisable to place data into the periscopic sextant to give the true heading and convert this heading to grid by applying the assumed LONG/CA.

8.11.4. Construction and use of the ZN graph is optional. The ZN graph is based upon the route of flight and dead reckoning. See AFPAM 11-216 for construction procedures.

8.11.5. Departure Requirements.

8.11.5.1. Polar true/grid courses as reflected in FLIP terminal charts will be used for departures in polar areas. **(T-2)** Before takeoff, visually align the aircraft with the runway heading and set the polar true/grid course of the runway in the aircraft's directional gyros. The navigator will set applicable systems in gyro mode with the correct latitude set. **(T-2)**

8.11.5.2. After reaching flight altitude, determine the polar true grid heading and reset the primary and secondary gyros. The type of chart being used will determine whether the heading will be polar grid heading or convergence grid heading.

8.11.6. Enroute Requirements.

8.11.6.1. The Grid Entry/Exit section of the AF Form 4116 will be completed prior to heading reference changes.**(T-3)** When entering grid operation, spot variation should be applied to the computed magnetic heading to obtain DGH. The aircraft will be established on the computed magnetic heading prior to resetting the heading references. **(T-3)** When exiting grid, the computed magnetic headings will be the target heading when the compass systems are reset. **(T-3)** In both cases, the computed magnetic headings will be compared to the flight plan to verify the accuracy of the courses measured and conversion data used. **(T-2)** This will ensure the validity of initial entry headings and provide precise target headings for exit.

8.11.6.2. Normally, the grid heading should be checked each 30-minutes after grid entry. If the compasses are precessing 3-degrees per hour or less, hourly checks may be obtained after the first hour. **Note:** On aircraft with reliable SCNS/INS, if the SCNS/INS heading is within 2-degrees of the initial celestial-derived grid heading, the SCNS/INS may be used to determine gyro precession.

8.11.6.3. Determine the precession information for each gyro after each heading check. When a gyro's precession is greater the 1-degree, reset the gyro to correct grid heading. When the period precession is 1-degree or less, the navigator may either reset the gyro or treat the precession as zero.

8.11.6.4. Whenever the period precession is greater the 1-degree (optional for 1-degree or less), the hourly precession rate may be removed by use of a false latitude setting. When the combined earth rate and gyro precession are less than +15 degrees/hour, the false latitude setting will totally compensate for precession. Two considerations are necessary:

8.11.6.4.1. Predicted precession becomes zero.

8.11.6.4.2. It may be necessary to adjust previous DR and air plot positions if the precession rate changes at subsequent heading checks. If this occurs, adjustments normally will be small and have negligible effect on DR and air plot accuracy; however, the effect should be considered.

8.11.6.5. To determine false latitude correction, enter the earth rate table with the desired latitude and extract the tabulated earth rate value. Algebraically combine the earth rate value and the observed hourly precession rate (use cumulative precession rate once a false latitude has been set). Re-enter the earth rate table with the combined value and extract the corresponding false latitude.

8.11.6.6. Only 15-degrees/hour can be removed by a false latitude setting. When the sum of earth and primary gyro precession rates exceed +15 degrees, the navigator must artificially steer the aircraft (in effect, the aircraft will fly a gentle arc) to compensate for the amount of precession in excess of +15 degrees/hour. **(T-2)** The formula used to correct the DGH to an initial grid heading (IGH) to fly appears on the AF Form 4116 as "RT/2 CORR" (note that the formula produces a correction, so the precession rate must be given its opposite sign). The precession rate used in the formula must be adjusted to reflect the time period in the DR ahead. **(T-2)** When "carrying" precession as suggested above, the navigator should consider several aspects of the navigational problem. **Note:** When precession exceeds 15-degrees per hour, consider the compasses unusable.

8.11.6.6.1. If alter headings are not made at heading check times, precession will have accumulated by alter heading times and a correction (opposite sign of precession) should be applied to the IGH using the total precession correction portion of the AF Form 4116.

8.11.6.6.2. If the precession rate changes at subsequent heading checks, it may be advisable to adjust previous DR and air plot positions.

8.11.7. Miscellaneous Procedures:

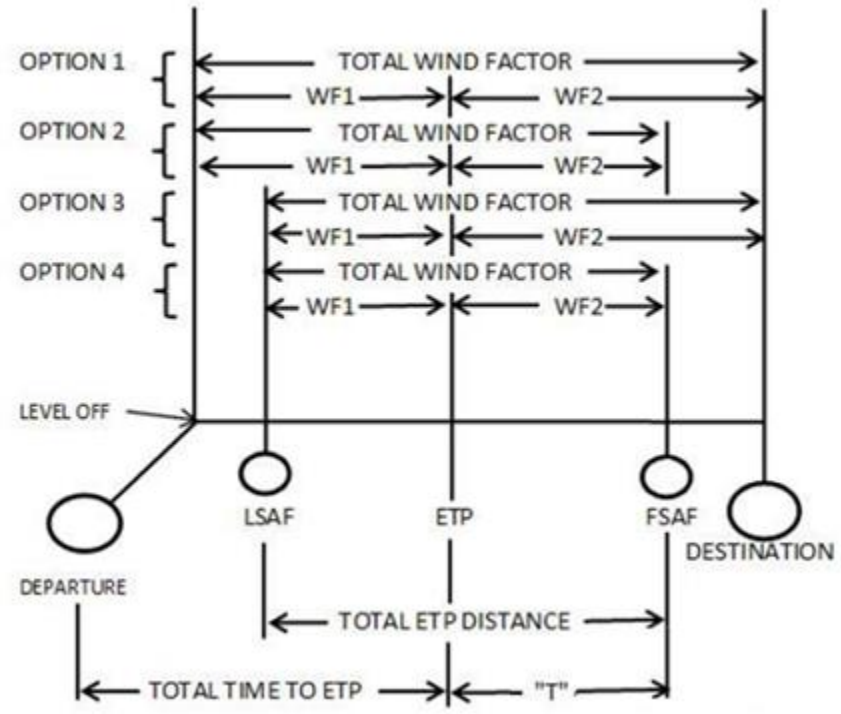
8.11.7.1. Normally, when changing charts or crossing the 180-degree meridian, only the reference changes; the heading of the aircraft is not altered. The change is made by comparing the grid courses and applying the difference to the gyro reading (old chart GC 350 degrees; new chart GC 331 degrees; GR 353; 350-331 = 019 = 334; reset the gyro to read 334).

8.11.7.2. Do not use the combined rhumb line/Coriolis correction when flying directional gyro. Use only Coriolis correction for celestial observations.

8.11.7.3. Always recheck computations and formulas when a radical change in precession is observed.

8.11.7.4. Grid certified navigators will maintain proficiency in grid procedures. **(T-2)**

Figure 8.1. ETP.



Computations.

1. WIND FACTOR COMPUTATION (USE OPTION 1, 2, 3 OR 4):

   A. TOTAL WIND FACTOR:

   TOTAL WIND FACTOR DISTANCE = AVERAGE GS
   TOTAL WIND FACTOR TIME

   B. FIRST HALF WIND FACTOR (WF1):

   DISTANCE FROM BEGIN PT TO APPROX MID-POINT = AVERAGE GS
   TIME FROM BEGIN PT TO APPORX MID-POINT

   NOTE: "BEGIN PT" IS THE LSAF OR L/O, WHICHEVER OCCURS LATER

   AVERAGE GS – PLANNED AVERAGE TAS = WF1

   C. SECOND HALF WIND FACTOR (WF2):

   DISTANCE FROM APPROX MID-POINT TO END PT = AVERAGE GS
   TIME FROM APPROX MID-POINT TO END PT

   NOTE: "END PT" IS THE FSAF OR DESTINATION, WHICHEVER OCCURS FIRST

AVERAGE GS – PLANNED AVERAGE TAS = WF2

2. ETP COMPUTATION

A. TOTAL ETP DISTANCE (LSAF TO FSAF) = "T" (TIME IN MIN FROM ETP TO FSAF)
(WF2 – WF1) + 2 * (PLANNED AVG TAS) 60

B. TIME (FROM DEPARTURE) TO ETP = TOTAL TIME TO FSAF - "T"

Figure 8.2. Example AF Form 4116 (1).

C-130 NAVIGATOR FLIGHT PLAN AND LOG

I. FLIGHT DATA

AIRCRAFT COMMANDER: Maj Hans O. Brick — AIRCRAFT TAIL #: 79-1018
NAVIGATOR: Maj Sarah B. Good — T/O TIME
DATE: 18 Oct 17 — PARKING SPOT: G-4 — PROPOSED: 0800
FROM: TXKF — TO: KPOB — ACTUAL: 0755

WPT	TO	TAS / ALT	TC / GC	WV / DA +/-40	TH / GH	VAR (+W/-E)	MH	GS	ZONE DIST	TOTAL DIST	ZONE TIME	TOTAL TIME	ETA	ATA	A/B
1 TXKF	LF WADE INTL N 32.22.00 W 064-41.65												0800	0755	+05A
2	LITTL N32-22.41 W066-04.61	189 /	270	240/40 -6R	264	+15W	279	154	70	70	+28	+28	0823	0823	+00A
L/O	Level Off	300 /	270	240/40 -6R	264	+15W	279	154	3	73	+01	+29	0824	0823	+01A
3	BOBBO N32-22.19 W067-12.25	300 / 22.0	270	220/50 -7R	263	+14W	277	265	54	127	+12	+41	0836	0835	+01A
4	JIMAC N32-21.45 W068-13.89		269		262	+14W	276	265	52	179	+12	+53	0848	0848	+00A
5	73W N32-25.00 W073-00.00		271	210/60 -10R	261	+12W	273	266	242	421	+54	1+47	0942	0943	+01B
6	OLDEY N32-15.74 W077-51.23		268	190/40 -8R	258	+9W	267	264	247	668	+56	2+43	1038	1040	+02B
7	CH (ASHLY) N32-58.58 W080-05.85		291	190/40 +1L	283	+8W	291	305	122	790	+24	3+07	1102	1105	+03B
8	FLO N34-13.98 W079-39.43		016	190/40 +1L	017	+8W	025	340	78	868	+14	3+21	1116	1119	+03B
9	BENTN (IAF) N35-13.61 W078-47.17		036	180/20 +2L	038	+9W	047	316	74	942	+14	3+35	1130	1134	+04B
10 KPOB	POPE AAF RWY 23 N35-10.72 W079-00.37		255	180/20 -4R	251	+9W	260	294	11	953	+02	3+37	1132	1136	+04B
ALT KGSB	SEYMOUR JOHNSON AFB	300 / 10.0	079	180/20 +4L	083	+9W	092	303	53		+11				

Figure 8.3. Example AF Form 4116 (2).

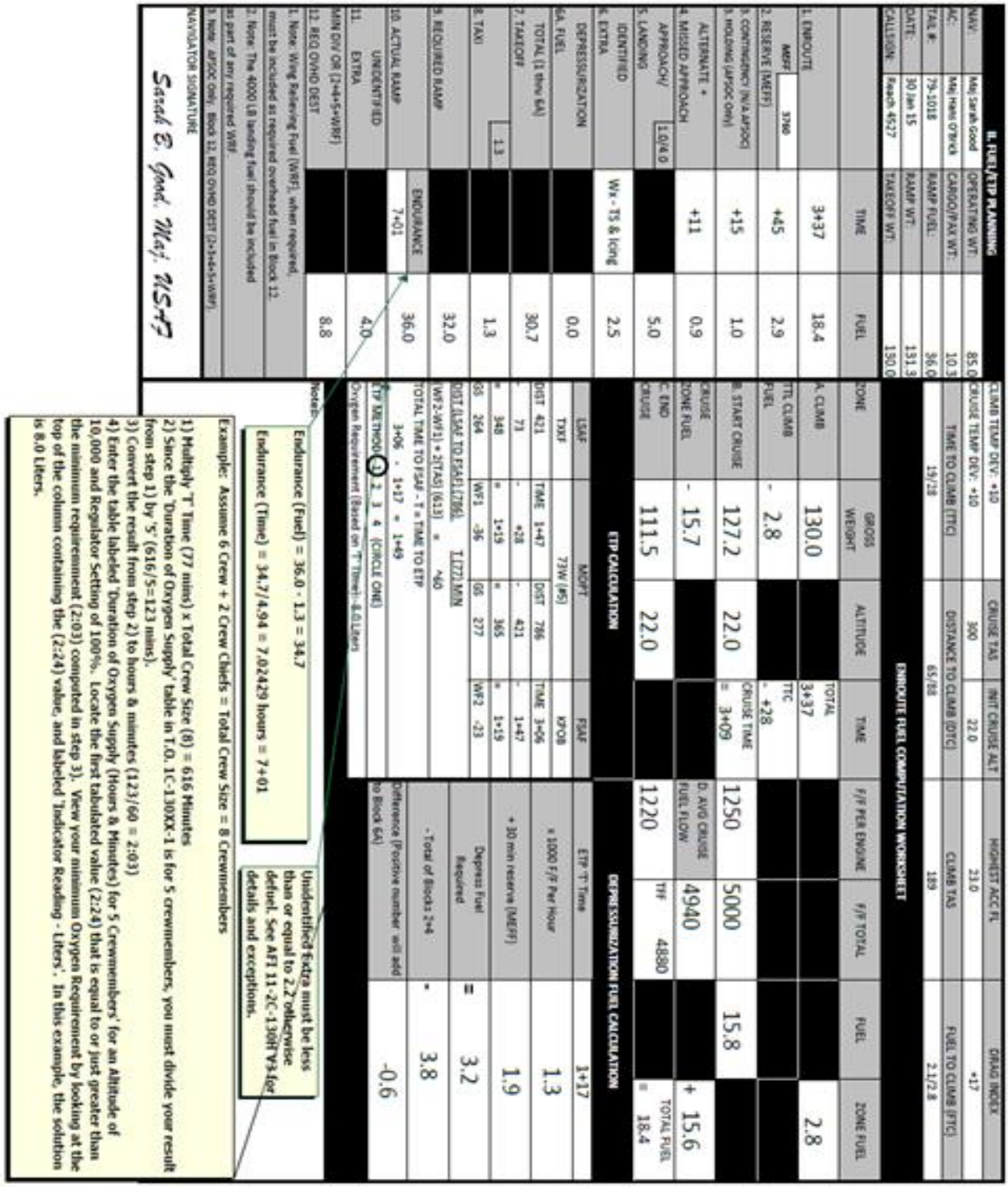


Figure 8.4. Example AF Form 4116 (3).

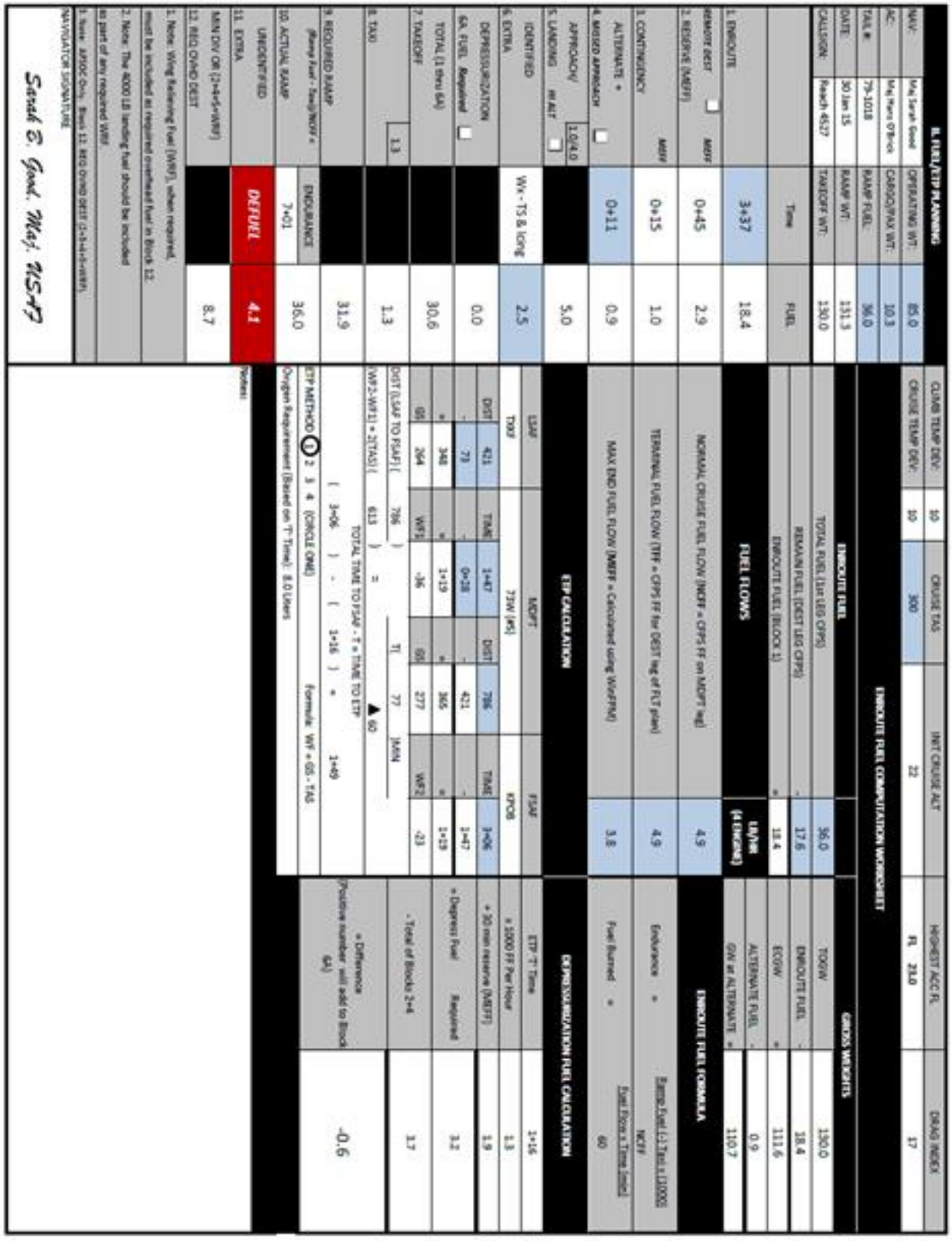


Figure 8.5. Example AF Form 4116 (4).

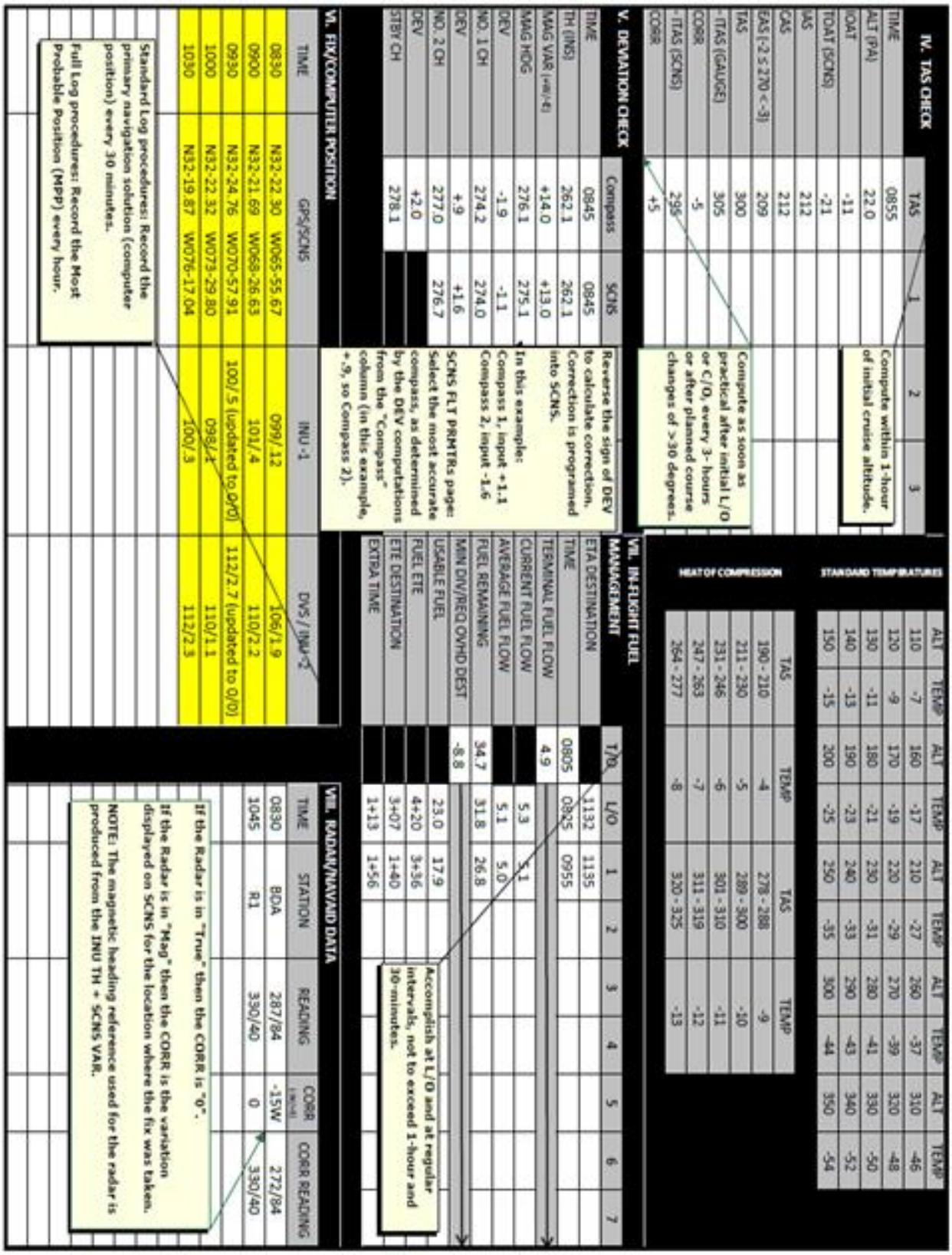


Figure 8.6. Example AF Form 4116 (5).

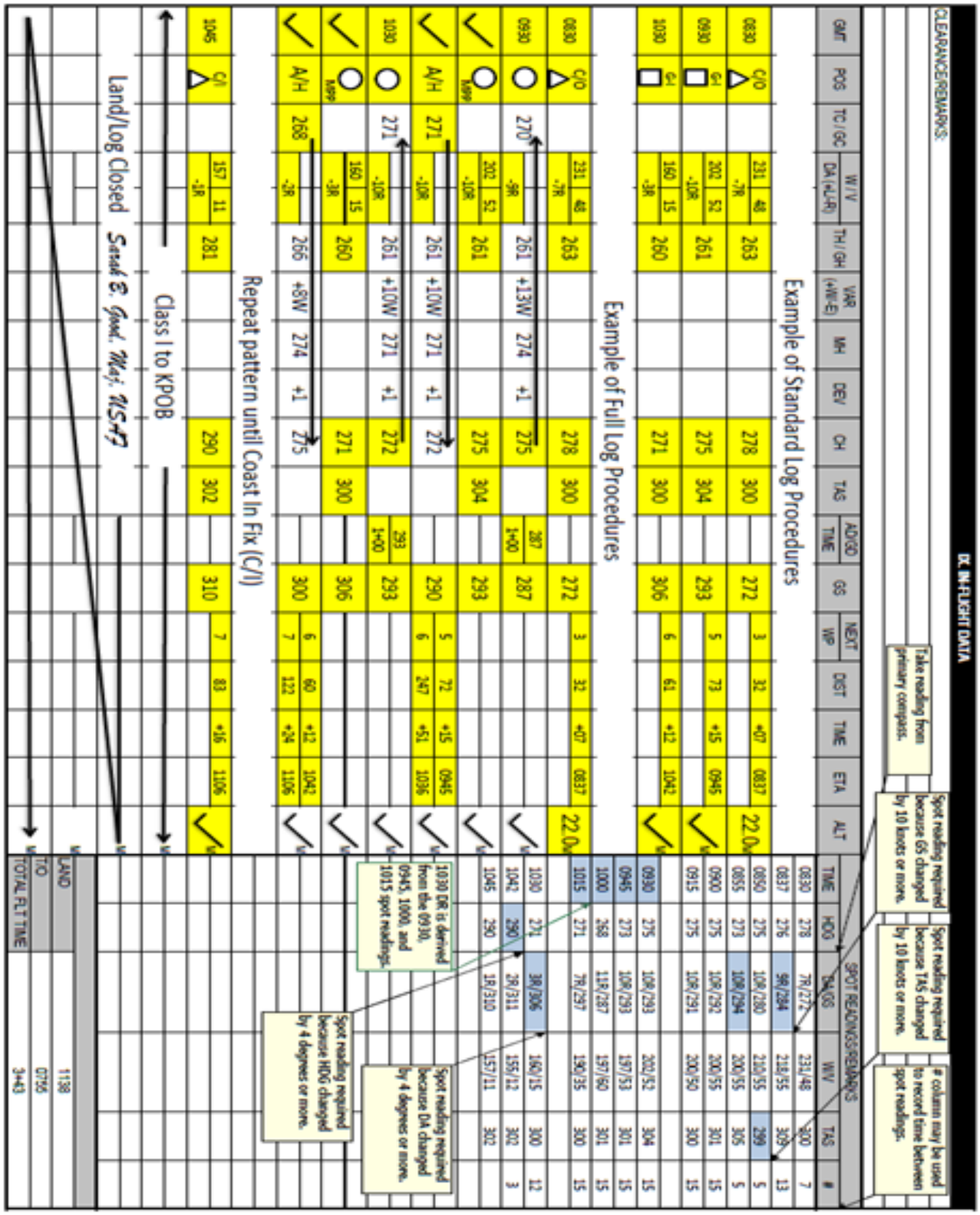
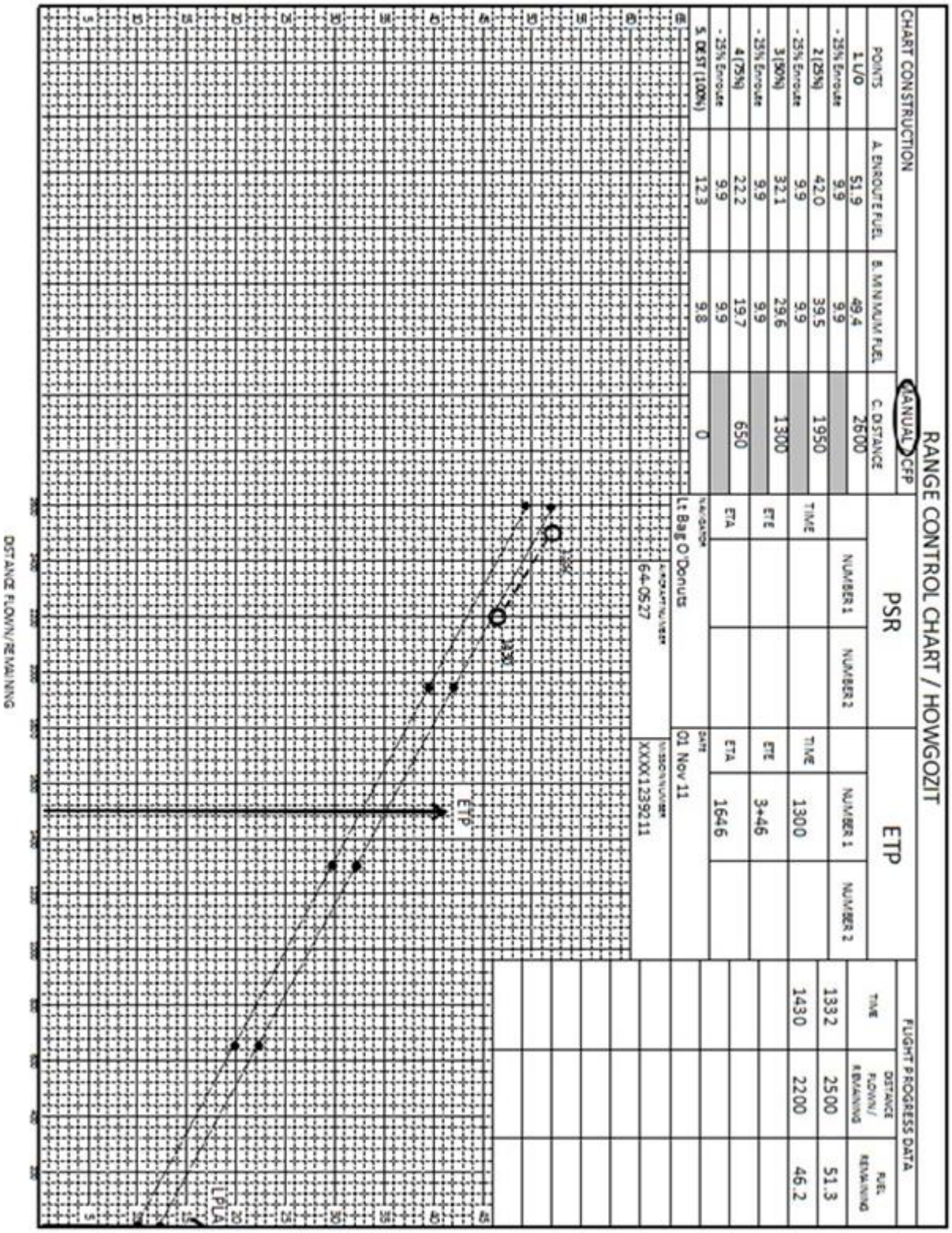


Figure 8.7. AF Form 4125, Range Control Chart.



8.12. VFR ARA Pattern Construction Procedures.

Figure 8.8. Approach – Required Obstruction Clearance (ROC).

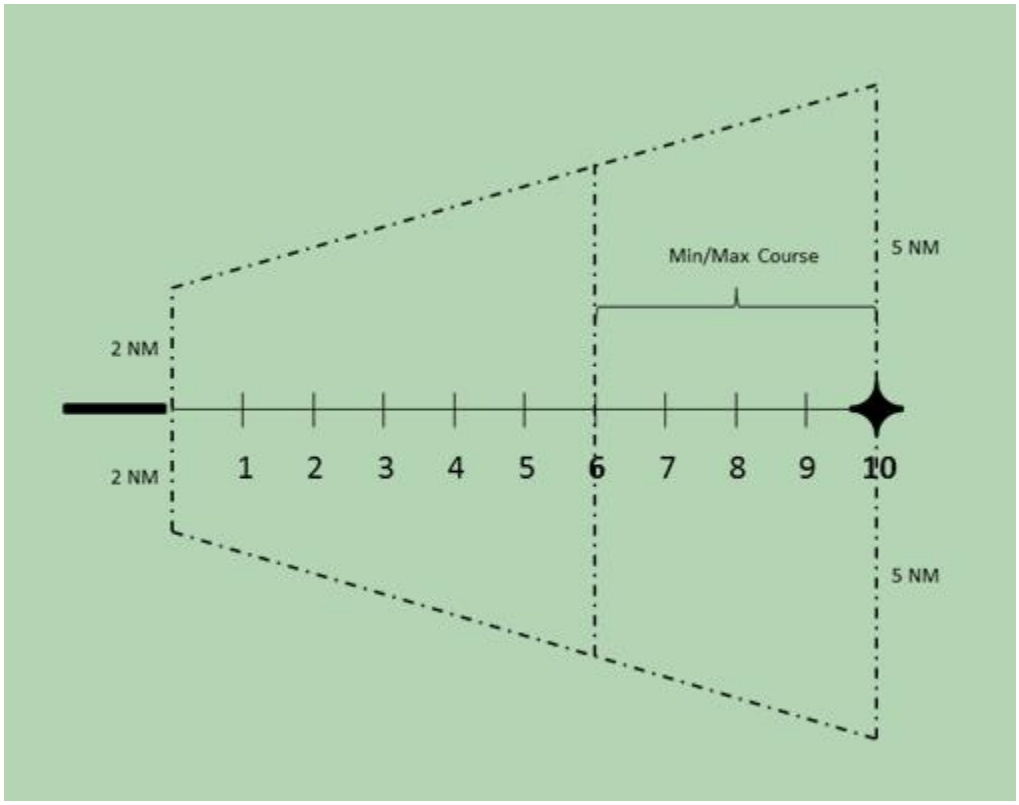


Figure 8.9. Descent Profile and MAP.

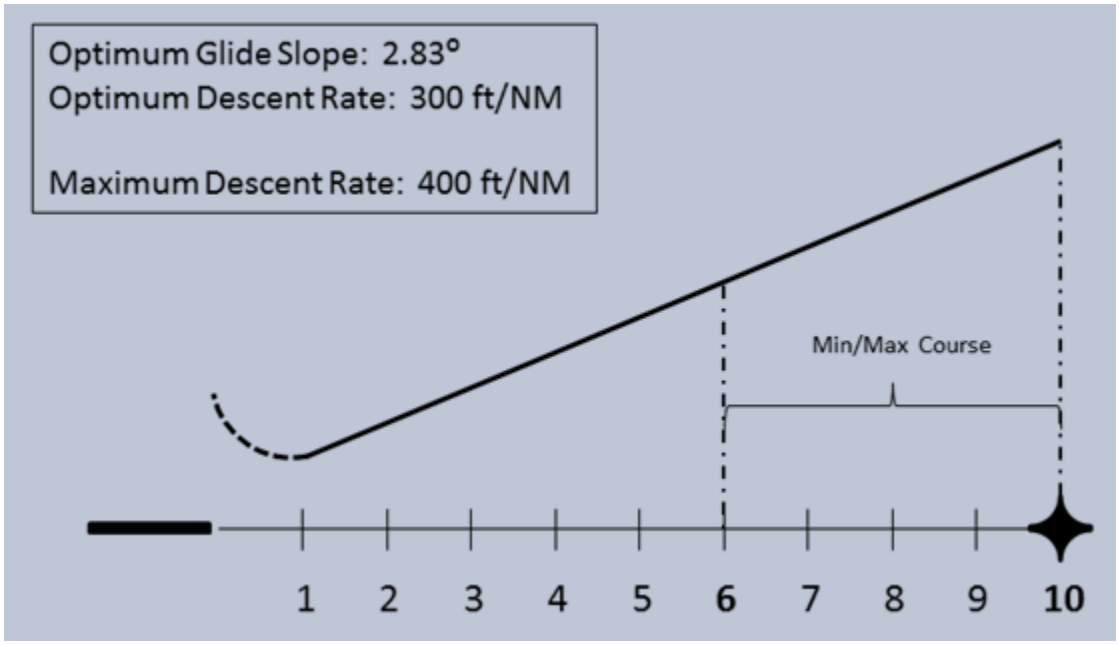
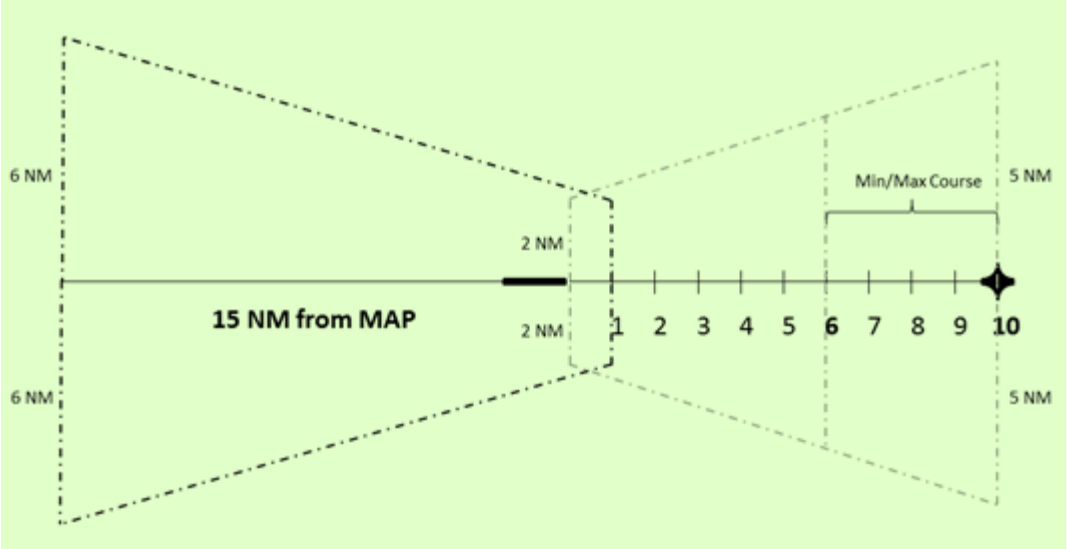


Figure 8.10. Missed Approach – Obstruction Clearance.



Chapter 9

FLIGHT ENGINEER / AIRCREW MAINTENANCE SUPPORT PROCEDURES

9.1. General. This chapter contains FE procedures not contained in the flight manual, other portions of this manual, or other publications.

9.2. Responsibilities. The FE is responsible to the PIC for all inspections and procedures required by the applicable technical orders and regulations.

9.3. Authority to Clear a Red X. If a situation is encountered where the aircraft is on a Red X and qualified maintenance personnel are not available to clear it, the highest qualified FE on scene may obtain authorization to sign off the Red X from the home station Maintenance Group Commander (MXG/CC) or designated representative, in accordance with T.O. 00-20-1, *Aerospace Equipment Maintenance Inspection*. Other crewmembers are not authorized to clear a Red X. **Exception:** The FE may clear Red Xs for engine panels and covers, pitot covers, gear pins and Single Point Refueling (SPR) drains when qualified maintenance personnel are not available, unless prohibited by the home station MXG/CC or OG/CC.

9.4. Aircraft Servicing and Ground Operations. The FE is certified and authorized to accomplish these duties when maintenance personnel are not available. This guidance is designed for support of the aircraft and its mission while away from home station. The applicable refueling and de-fueling checklists will be used during all refueling and de-fueling operations. **(T-3)** If ground support personnel are not available, the AC will designate other crewmembers to assist the FE. **(T-3)** A FE may assist the normal maintenance function when critical taskings dictate their use, provided this action does not impact crew duty and crew rest limits specified in AFMAN 11-202V3_AMCSUP. **WARNING:** Do not load/offload cargo containing explosives, oxygen, flammable gases or liquids during any fuel servicing operations.

9.4.1. Fuel Servicing Operations. Unless servicing JP-4, simultaneous servicing of fuel while loading passengers, cargo, performing maintenance, aircrew members performing inspections, or operating aircraft systems is considered to be a normal fuel servicing operation. If refueling/defueling with JP-4, Concurrent Servicing operations are required in accordance with T.O. 00-25-172. Aircrew members certified in ground refueling may perform fuel servicing duties. Aircrews will only refuel in cases when maintenance support is not readily available and the mission would be delayed. **(T-3)**

9.4.1.1. When crewmembers are required to refuel, the FE will act as the refueling team supervisor. **(T-3)** FEs will comply with T.O. 00-25-172 and applicable T.O. 1C-130XX series. **(T-3)** Two other crewmembers are required to assist in the refueling, one for safety duties and the other to act as fire guard.

9.4.1.2. Designate a current and qualified maintenance personnel or aircrew member to remain on the flight deck to monitor interphone and be prepared to broadcast a request for emergency assistance on a radio tuned to the appropriate agency with ready access to an emergency response team anytime aircrew members are in the aircraft and fuel servicing is being conducted. The PA may be used to direct passenger evacuation in an emergency.

9.4.1.3. With passengers on board, a current and qualified aircrew member will be designated the passenger compartment monitor (PCM) and shall continuously monitor

passengers during fuel servicing operations. **(T-3)** PCMs will not perform other duties during fuel servicing. **(T-3)**

9.4.1.4. The PCM shall brief passengers on emergency egress, exits, prohibitions, and hazards. **(T-3)** Passengers will remain seated except for brief physiological needs, but will not wear seat belts. **(T-3)** When possible, conduct this briefing prior to fuel servicing. If fuel servicing is in progress, the briefing will be given immediately after boarding. **(T-3)**

9.4.1.5. When authorized, passengers may board or exit the aircraft for the express purpose of loading for departure or offloading upon arrival. Boarding or exiting must be opposite of fuel servicing operations. **(T-3)** Once onboard, except for emergencies, passengers shall not deplane once fuel servicing commences. **(T-3)**

9.4.1.6. Passengers are not required to ground themselves.

9.4.1.7. The PIC, or designated maintenance/aircrew representative will advise PCMs when to evacuate passengers. **(T-3)**

9.4.1.8. The PCM shall set the interior lighting as bright as possible to suit the combat environment. **(T-3)**

9.4.1.9. The LM shall ensure cargo loading or unloading does not jeopardize passenger safety. **(T-3)** Winching is prohibited with passengers on board.

9.4.1.10. Simultaneous fuel and oxygen servicing is not authorized.

9.4.1.11. Winching of rolling stock and non-spark producing (e.g., wooden) pallets is authorized. Driving vehicles equipped with spark arresters is authorized during fuel servicing. When loading vehicles without spark arresters, the vehicles must be either completely inside the cargo compartment, or outside of the established fuel servicing safety zone, before fuel servicing lines can be pressurized. **(T-2) Exception:** Diesel and turbo-charged (without waste gates) gasoline-powered vehicles can be onloaded or offloaded without having to stop fuel flow.

9.4.1.12. Electronic equipment may be on and operated to include operations performed by aircrew members during required inspections. **Exceptions:**

9.4.1.12.1. Radar Altimeters and Tactical Air Navigation (TACANs) must be turned off. **(T-2)**

9.4.1.12.2. Radar may be in STBY but, if time permits, should be turned off.

9.4.1.12.3. IFF/SIF may be in standby but, if time permits, should be turned off.

9.4.1.12.4. SCNS/INU may be on and may be updated. Do not turn on or off during refuel operations.

9.4.1.12.5. HF radios must be turned off. **(T-2)**

9.4.2. Hot Refueling. Hot refueling (refueling with aircraft engines running) will only be conducted by crews that have been authorized and certified according to AFI 11-235, *Specialized Refueling Operations*. **(T-2)**

9.5. Aircraft Recovery Away from Main Operating Base (MOB). The PIC is responsible for ensuring the aircraft is turned to meet subsequent mission taskings. **(T-3)** If qualified maintenance

specialists are unavailable, the aircrew is responsible for turning the aircraft to meet subsequent mission taskings. **(T-3)**

9.5.1. The PIC is responsible for the recovery items including:

9.5.1.1. Parking and receiving.

9.5.1.2. Aircraft servicing, including AGE usage.

9.5.1.3. Supervision of minor maintenance within local capability.

9.5.1.4. Minor configuration changes to meet mission tasking.

9.5.1.5. Securing the aircraft before entering crew rest.

9.5.1.6. Coordinating aircraft security requirements.

9.5.1.7. Documenting AFTO 781-series forms.

9.5.2. In all cases where aircrews must service the aircraft without qualified maintenance specialist assistance, comply with the appropriate maintenance T.O. **(T-2)**

9.5.3. Aircrews are not qualified to accomplish the required ground inspections. In those instances where maintenance personnel are not available, the aircrew will enter a red dash symbol in the AFTO Form 781H, *Aerospace Vehicle Flight Status and Maintenance Document*, updating current maintenance status and enter a red dash symbol and a discrepancy that reflects that the applicable maintenance inspection (e.g., preflight, thru-flight, basic post-flight) is overdue. **(T-2)**

9.6. Aircraft Structural Integrity Program. Complete aircraft data, in accordance with T.O. 1C-130-101, *Implementation of C-130 Series Aircraft Usage Report* on all flights.

9.7. Aircraft Systems/Forms Management.

9.7.1. The FE will monitor aircraft systems during all flight and ground operations. **(T-3)** Notify the pilot of all abnormal indications and take action as required.

9.7.2. In addition to the procedures in T.O. 00-20-1 and DAFMAN 11-401, the FE will assist the pilot in maintaining the AFTO Form 781. **(T-3)**

9.8. Performance Data, including TOLD Card. TOLD computations will be placed on the C-130 Takeoff and Landing Data Card and Pilot Information Card from the T.O. 1C-130XX-1-1. **(T-3)**

9.8.1. All performance calculations will be based on 95 percent engines. **(T-2)** TOLD card computations will be accomplished using flight manual performance data, approved tabulated data, or the EFB eTOLD application if updated with most current 1-1 or 1-11 data. **(T-2)**

9.8.2. When conducting flaps up landing, compute and post Vmca speeds for both configurations; flaps 50% and flaps up (normal boost). For example: Vmca, in ground effect, one engine INOP – 105/122.

9.8.3. Minimum TOLD requirements for a termination landing are: Air Minimum Control Speeds, Obstacle Clearance Speed, 3 Engine Climb Speed, 100 and 50% Flap Landing Speeds and Distances, 0% Flap Landing Approach Speed (Night or IMC), and 3 Eng. Ft/NM.

9.9. Fuel Management/Monitoring. The FE is responsible for management of fuel in accordance with the applicable flight manual and mission requirements. Additionally, the FE will monitor fuel usage and destination fuel requirements in conjunction with the pilots. **(T-3)** However, the AC retains overall responsibility for ensuring adequate fuel reserves for mission accomplishment.

9.9.1. AF Form 4108, *C-130 Fuel Log*. The purpose of the form is to provide an orderly method of recording fuel consumption and aircraft GW. The following instructions standardize procedures for the completion and disposition of AF Form 4108:

9.9.2. The AF Form 4108 may be completed whenever the navigator completes AF Form 4116 at the discretion of the PIC. The log may be filled out as necessary to accomplish training or corrective action. When the fuel log is completed, it is not required to fill out the reverse side of the Pilot Information Card.

9.9.3. Responsibility:

9.9.3.1. If the AF Form 4108 is completed, it will be accomplished by the FE. **(T-3)**

9.9.3.2. Return completed forms to the unit of the individual completing the form. **(T-3)**

9.9.4. Additional Information. AF Form 4108 provides as a simple method of recording aircraft fuel data and is adequate for normal operational requirements. When additional information is required for identifying trends in engine failure or performance or for special test programs, the directing headquarters will furnish necessary forms and instructions to complete the program. **(T-2)**

9.9.5. Instructions. Form heading entries are self-explanatory.

9.9.5.1. Block 1-FUEL GAUGE POUNDS. Record fuel quantity from the fuel quantity indicators before and after flight. This reading is normally taken prior to engine start with the indicators powered and after flight prior to power being removed from the indicators.

9.9.5.2. Block 2-WEIGHT DATA. Record operating weight and cargo weight (including passenger weight) from DD Form 365-4, *Weight and Balance Clearance Form F—Tactical/Transport*. Ramp fuel weight is obtained from block 1 (Fuel Gauge). The blank space may be used for last minute changes prior to engine start or as required.

9.9.5.3. Block 3-FUEL ON/OFFLOAD. Enter total weight of fuel on or offload during air refueling in this block.

9.9.5.4. Block 4-PAX/CARGO OFFLOAD. Enter total weight of passengers and cargo extracted during flight in this block.

9.9.5.5. Block 5-ENGINE START Z. Enter GMT of last engine started.

9.9.5.6. Block 6-COND. Enter symbol depicting flight condition as follows:

9.9.5.6.1. WU/TAXI/TAKEOFF-Indicates warm-up taxi and takeoff conditions.

9.9.5.6.2. Initial climb is indicated by symbol (1k). Secondary and subsequent climbs are shown as (2 k, 3k, etc.). The number here indicates sequence of condition in flight profile. This is also true of cruise segments and descents. Climbs of 4,000 feet or less will not be recorded separately but will be included in preceding cruise increments. **(T-3)** When constant climb is maintained to cruise altitude, use fuel flow reading taken at

2/3 climb altitude. When constant climb cannot be maintained to cruise altitude due to ATC clearances, etc., enter difference between sum of individual fuel quantity gauge readings at beginning and end of climb.

9.9.5.6.3. Cruise operating conditions are indicated by the number in cruise sequence and an arrow (1g, 2g, 3g, etc.). Instrument readings will be averaged for this period. **(T-3)** Normally, cruise entries will be no more than 1 hour. **(T-3)** However, the first cruise, the cruise immediately prior to enroute or step climb and/or the last cruise prior to descent, may be no less than 30 minutes, nor more than 1 hour and 30 minutes.

9.9.5.6.4. Descents are shown as (1m, 2m, 3m, etc.). Do not confuse descent with the final letdown that occurs when landing procedures begin. The loss in altitude during final letdown is indicated by "L & T." Landing and taxi is that condition from the end of the last entry in the sequence of descents to engine shutdown on the ramp. Holding time, however, must be accounted for as an additional cruise (g) condition after descent when necessary. **(T-3)** Descents of 4,000 feet or less will not be recorded separately but will be indicated in the preceding cruise increment. **(T-3)** When descent exceeds 4,000 feet, blocks 10 through 18 need not be completed.

9.9.5.6.5. Air-Air Refueling Tanker Operation, Air-Air Refueling Receiver Operation. Cruise, climb, or descent to refueling altitude (end this condition approximately at start of on/ offload of fuel). Indicate AR and ARR 1, 2, etc., in condition block, for refueling condition. Blocks 10 through 18 need not be completed. Blocks 19, 20, 22, 25, and 28 entries are not required for ARR. At completion of on or offload of fuel, a new cruise, climb, or descent condition will be initiated. **(T-3)** **Note:** Rescue, search, storm penetration, combat/combat support, or any special mission which requires constant variations in altitude and airspeed may use the same procedures as air refueling operations. For this type of condition use an "S" in the condition block.

9.9.5.7. Block 7-END. Enter GMT for end of condition.

9.9.5.8. Block 8-SET. Enter increment time duration for the condition for WU/TAX/TO. All warm-up and taxi times will be entered in the circle of the SET block. **(T-3)** Takeoff time is computed from brake release to the first change of power (when reduced power procedures are used, compute takeoff time using 2 minutes).

9.9.5.9. Block 9-TOTAL. Enter cumulative total time of SET time; excluding the warm-up and taxi times entered in the circle SET time.

9.9.5.10. Block 10-IOAT. Enter indicated outside air temperature reading.

9.9.5.11. Block 11-Outside Air Temperature (OAT)/VAR:

9.9.5.11.1. OATC (Outside Air Temperature Corrected). Enter corrected outside air temperature as determined from the appropriate performance manual.

9.9.5.11.2. VAR. Enter temperature variation from standard International Civil Aviation (ICAO) temperature.

9.9.5.12. Block 12-HP. Enter the pressure altitude for the condition with altimeter set at 29.92 Hg.

9.9.5.12.1. For climb, enter HP for 2/3 the intended climb as soon as the altitude to which the climb is to be made is known. The entry (2/3 HP) reflects pressure altitude for 2/3 of the actual climb. If a climb starts at 15,000 feet and terminates at 30,000 feet, compute the pressure altitude for 2/3 of the 15,000 difference, which is 10,000 feet. This HP added to the 15,000 feet beginning HP equals 25,000 feet HP, which is the appropriate entry for this climb.

9.9.5.12.2. For cruise, enter the actual HP.

9.9.5.12.3. When descent exceeds 4,000 feet, blocks 10 through 18 need not be completed.

9.9.5.13. Block 13-CRUISE CEILING. Enter 4-engine cruise ceiling for the aircraft from the appropriate performance manual.

9.9.5.14. Block 14-CRUISE IAS. Enter indicated airspeed from the appropriate performance manual required to maintain desired true airspeed.

9.9.5.15. Block 15-TORQUE. Enter torque value from the appropriate performance manual required to maintain the desired true airspeed.

9.9.5.16. Block 16-3-ENGINE SERVICE CEILING. Enter 3-engine service ceiling from the appropriate performance manual.

9.9.5.17. Block 17-3-ENGINE DRIFTDOWN IAS. Enter the 3-engine driftdown indicated airspeed from the appropriate performance manual.

9.9.5.18. Block l8-ENGINE INST F/F LBS/HR. Enter the average individual fuel flow reading and total for the period. Engine instrument fuel flow (lbs./hr.) will be the complete figure (4800 not 4.8). **(T-3)**

9.9.5.19. Block 19-PERIOD (FUEL USED). Enter fuel used for engines for the period as computed using total of fuel flow readings. **Note:** For fuel used during WU/TAXI, use 50 lbs. per minute. For fuel used during TAKEOFF, use 300 lbs. Enter all fuel used, fuel remaining, and GWs in thousands. **Example:** 127,300 = 127.3. All weights are to be carried to the nearest hundred. **Exception:** Engine instrument fuel flow (lbs./hr.) will be a complete figure. **(T-3)**

9.9.5.20. Block 20-EXTRA (FUEL USED). Enter extra fuel used during flight condition period for fuel jettisoning, APU, etc. Fuel transferred to a receiver during air refueling will be entered in this block. **(T-3)**

9.9.5.21. Block 21-TOTAL (FUEL USED). Enter cumulative total of fuel used for successive conditions. This block represents all fuel consumed to END clock time entered in block 7. ARR (receiver) start new condition (cruise, climb, or descent) after refueling with "O" (zero) fuel used.

9.9.5.22. Block 22-PERIOD (CALC FUEL REMAINING). Enter the amount of fuel consumed (block 19 plus block 20) for flight condition as determined by calculation.

9.9.5.23. Block 23-TOTAL (CALC REMAINING). Enter the total amount of the calculated fuel remaining by subtracting the amount in block 22 from the amount of calculated fuel remaining at END clock time entered in block 7. ARR (receiver) condition.

Enter cumulative total of fuel (indicated by individual gage readings) on board airplane after refueling.

9.9.5.24. Block 24-This block is unlabeled to facilitate entering the total ramp fuel from block 2, WEIGHT DATA. Enter the ramp calculated fuel aboard, obtained by either measurement with a dipstick and applying any known correction factor or as indicated by total of fuel quantity indicators. On reverse side of form, this block is used to carry forward previous quantity from front side of form.

9.9.5.25. Block 25-GAUGE PERIOD (GAUGE FUEL REMAINING). Enter the period fuel used for flight condition as determined by the fuel gage readings for present condition compared to the fuel gage reading for previous condition. For fuel used during WU/TAXI, use 50 lbs. per minute. For fuel used during TAKEOFF, use 300lbs.

9.9.5.26. Block 26-TOTAL (GAUGE TOTAL). Enter total of fuel as indicated by the individual quantity gages. ARR (receiver) condition. Enter cumulative total of fuel (individual gage readings) onboard airplane after refueling.

9.9.5.27. Block 27-This block is unlabeled to facilitate entering total ramp fuel from Block 2. WEIGHT DATA. Enter the ramp calculated fuel aboard obtained by either measurement with the dipstick and applying any known correction factor or as indicated by the total of fuel quantity indicators. On reverse side of the form this block is used to carry forward previous quantity from the front side of the form.

9.9.5.28. Block 28-FUEL USED. Enter the fuel used from total of blocks 19 and 20.

9.9.5.29. Block 29-ON/OFFLOAD. After the aerial delivery of troops or equipment or after aerial refueling, enter the weight loss or gain to properly indicate actual GW of airplane in block 30.

9.9.5.30. Block 30-END GROSS WEIGHT. Enter the aircraft GW at end of period. This weight is found by subtracting fuel used for this period (Block 21) from previous ending GW. If entry was made in block 29 (ON/OFFLOAD), this weight must also be added or subtracted from the previous ending GW to arrive at correct END GROSS WEIGHT figure. **(T-3)**

9.9.5.31. Block 31-. This block is unlabeled to facilitate entering total ramp GW from Block 2. WEIGHT DATA. On reverse side of form, this block is used to carry forward previous weight from the front side of form.

9.9.5.32. Block 32-REMARKS. Enter any remarks or observations, including instrument readings pertinent to flight which are noteworthy.

9.10. HOSTILE ENVIRONMENT REPAIR PROCEDURES.

9.10.1. General. This manual establishes operational procedures for C-130H HERP. Authority to use HERP is granted by OG/CC/CD for Operations when the aircraft is directed into a hostile or potentially hostile environment or in extreme cases where recovery of the aircraft or completion of the mission dictates their use. This authority is documented on the FRAG or ATO. The OG/CC/CD for Operations may delegate this authority as necessary in cases where: (1) The unit is geographically separated from the parent unit, or (2) the unit is deployed or otherwise not co-located with the OG/CC/CD for Operations. All normal avenues of repair/recovery should be exhausted (when practical) prior to use of the HERP. Procedures

identified with an asterisk (*) are not considered a HERP and may be accomplished at the discretion of the PIC. When HERP are actually employed, inform MAJCOM Stan/Eval. Include a brief description of the circumstances and conditions leading to the decision to approve HERP.

9.10.2. Hostile Environment Repair Kit (HERK). A complete repair kit is prescribed in **Table 9.1** Units will identify repair kit inventory and issue procedures in the unit supplement to this manual. **(T-3)**

9.10.3. Designated Hostile Environment Repair Procedures:

9.10.3.1. Battery Dead or Damaged. **WARNING:** If the aircraft battery is damaged, disconnect and remove it from the aircraft. Use caution to avoid acid burns if the battery is leaking. When swapping batteries, the battery connector should be installed as rapidly as possible to preclude excess arcing. **CAUTION:** When flying with a dead or otherwise disabled battery, ensure the DC Power Switch remains in the "BATTERY" position. **CAUTION:** When installing or removing battery connectors and recommended jumper wires electrical arcing is possible. **Note:** If aircraft is equipped with an Emergency INS Battery Bus Tie Switch (TCTO 1C-130-1723) and has a serviceable INS/SCNS battery, proceed to **paragraph 9.10.3.2**. **Note:** If another aircraft is available, temporarily place its operable battery (or INS battery when available) in the disabled aircraft until at least one engine is operating.

9.10.3.1.1. Jumping Battery – Aircraft to Aircraft. **WARNING:** Fire protection is not available for the APU, until the Battery Relay is jumped. **CAUTION:** Reduce DC load on disabled aircraft as much as possible to preclude the possibility of over loading the DC cargo winch current limiter.

9.10.3.1.1.1. Position aircraft nose to nose to allow the DC power cable (or cables) to reach.

9.10.3.1.1.2. Join both aircraft DC power cables by use of the extender plug or brass bars listed in **Table 9.1**.

9.10.3.1.1.3. Place cable from operating aircraft DC winch receptacle to external DC power receptacle of disabled aircraft.

9.10.3.1.1.4. DC power switch on disabled aircraft to "External DC" position.

9.10.3.1.1.5. Start APU on disabled aircraft.

9.10.3.1.1.6. APU Generator Switch – ON.

9.10.3.1.1.7. Remove cable from the DC winch receptacle to the external DC power receptacle of the disabled aircraft.

9.10.3.1.1.8. Accomplish failed battery relay procedure. (See **Paragraph 9.10.3.5**).

9.10.3.1.1.9. When battery relay is closed and APU generator is powering TR units on the aircraft supplying DC power to the ESS and Main DC buses, remove jumper cables and continue with STARTING ENGINES CHECKLIST. **Note:** It is recommended to start at least one engine and have its generator on line before disconnecting power cables.

9.10.3.1.2. DC Power Without Usable Aircraft Battery Or Spare Aircraft.

9.10.3.1.2.1. Obtain two 12 volt or one 24 volt battery and jumper cables, or suitable heavy duty cable, modified as required. (DC cargo winch cable may be used).

9.10.3.1.2.2. Use option one to connect the external batteries to the battery connector, or option two to connect the external batteries to the external DC power receptacle. (See **Figure 9.1**) **CAUTION:** When jumping batteries to aircraft battery wiring ensure proper polarity is used otherwise damage to equipment or personnel can occur.

9.10.3.1.2.3. Option one **(**See **Figure 9.1**) Insert stock into battery connector run cables to either one 24 volt battery or two 12 volt batteries connected in series. Place DC Power Switch to "Battery." **Note:** With DC power switch placed in the EXT DC position (option two) check the EXT DC PWR light ON. If the light is not illuminated, check all connections and battery polarity.

9.10.3.1.2.4. Option two **(**See **Figure 9.1**) Attach cables from either one 24 volt battery or two 12 volt batteries connected in series to the external DC power receptacle. Place the DC Power Switch to "EXT DC." **WARNING:** There will be no aircraft fire protection available if Option 2 is used.

9.10.3.1.2.5. Start APU. **WARNING:** If option two is utilized, fire protection is not available for the APU, until the Battery Relay is jumped.

9.10.3.1.2.5.1. Control Switch – Start, Run.

9.10.3.1.2.5.2. Bus Tie Switch – Tied.

9.10.3.1.2.6. APU generator-ON, checked.

9.10.3.1.2.7. If option two was utilized, jump battery relay using failed battery relay procedure. (See **paragraph 9.10.3.5**).

9.10.3.1.2.8. Start an engine and place the generator switch to ON.

9.10.3.1.2.9. Disconnect jumper cables.

9.10.3.2. Starting Aircraft with Emergency INS Battery Bus Tie Switch. (Airplanes modified by TCTO 1C-130-1723). **WARNING:** If the aircraft battery is damaged, disconnect and remove it from the aircraft. Use caution to avoid acid burns if the battery is leaking.

9.10.3.2.1. Complete applicable items on the Cockpit and Before Starting Engines checklist. **CAUTION:** Reduce DC load as much as possible to preclude the possibility of overloading the INS battery.

9.10.3.2.2. Open pilot's lower, forward circuit breaker panel.

9.10.3.2.3. Install a #4 jumper wire on the A-1 and A-2 terminals of the battery relay. (See **Figure 9.2**).

9.10.3.2.4. Close pilot's lower, forward circuit breaker panel.

9.10.3.2.5. Engage Emergency INS Battery Bus Tie Switch above pilot's upper circuit breaker panel.

9.10.3.2.6. DC Voltmeter Switch – Essential DC Bus then Battery Bus, check voltage. **Note:** If Essential DC Bus is not powered, see **paragraph 9.10.3.3** **Note:** The Battery, Isolated, Essential, and Main DC Buses will be powered by the INS Battery. Minimize loading on all DC buses.

9.10.3.2.7. DC Power Switch – Battery.

9.10.3.2.8. Start APU.

9.10.3.2.9. APU Generator – ON, check voltage and frequency.

9.10.3.2.10. Start any engine in Normal Ground Idle.

9.10.3.2.11. Engine GEN switch – ON, check voltage and frequency.

9.10.3.2.12. Review Cockpit and Before Starting Engines checklists.

9.10.3.2.13. Start the remaining engines using the Starting Engines checklist.

9.10.3.2.14. Closely monitor INS battery and aircraft battery bus voltage during flight. **WARNING:** The Battery Bus might not be powered if the Isolated DC or Essential DC Buses are isolated using the flight manual bus isolation procedures. Fire protection and radio communications might not be available. **Note:** The Essential DC Bus can be isolated using the flight manual bus isolation procedures but the Emergency INS Battery Bus Tie Switch above the pilot's upper circuit breaker panel must also be disengaged. **(T-2)**

9.10.3.3. Bypassing the INS Reverse Current Relay (RCR) (Airplanes not modified by TCTO 1C-130-1723). **WARNING:** When performing maintenance inside any circuit breaker panel all aircraft power must be removed to prevent injury to personnel or equipment. **(T-2) WARNING:** If the aircraft battery is damaged, disconnect and remove it from the aircraft. Use caution to avoid acid burns if the battery is leaking.

9.10.3.3.1. Before jumping terminals APP to BATT on the INS RCR, first disconnect the INS Battery or arcing may occur. **(T-2)**

9.10.3.3.2. Open the pilot's upper circuit breaker panel.

9.10.3.3.3. Jump the INS RCR by installing a #10 jumper wire from the APP terminal to the BATT terminal of the reverse current relay (See **Figure 9.11**).

9.10.3.3.4. Reconnect the INS Battery connector.

9.10.3.3.5. Check the DC voltmeter in the ESS DC BUS position to verify the bus is powered.

9.10.3.3.6. If the ESS DC BUS is not powered, bypass the relay as follows:

9.10.3.3.6.1. Remove all power from the aircraft.

9.10.3.3.6.2. Disconnect the INS battery.

9.10.3.3.6.3. Bypass the INS RCR by installing a #4 jumper wire from the GEN terminal to the BAT terminal of the reverse current relay (See **Figure 9.11)**.

9.10.3.3.6.4. Connect the INS battery.

9.10.3.3.7. Start APU. **WARNING:** Fire protection is not available for the APU, until the Battery Relay is jumped.

9.10.3.3.8. Place Bleed Air Valve switch to OPEN.

9.10.3.3.9. Place APU generator switch to ON. Check Voltage and Frequency.

9.10.3.3.10. Remove #10 jumper wire from the INS RCR.

9.10.3.3.11. Jump the battery relay using Failed Battery Relay procedure. (See **paragraph 9.10.3.5**). **WARNING:** If the INS RCR has been bypassed by installing the #4 jumper wire, neither the ISOLATED DC bus nor the ESSENTIAL DC bus can be isolated using bus isolation procedures in the flight manual.

9.10.3.4. Failed RCR between Isolated and Essential DC Bus. **WARNING:** When performing maintenance inside any circuit breaker panel all aircraft power must be removed to prevent injury to personnel or equipment. **(T-2)**

9.10.3.4.1. Remove External Power and disconnect both the Aircraft and INS/SCNS batteries.

9.10.3.4.2. Open pilot's side circuit breaker panel.

9.10.3.4.3. Install a #10 jumper wire between the SW post and the APP post (See **Figure 9.2**).

9.10.3.4.4. If the RCR fails to energize, bypass the relay as follows:

9.10.3.4.4.1. Remove all power from the aircraft.

9.10.3.4.4.2. Disconnect the aircraft battery.

9.10.3.4.4.3. Install a #4 jumper wire between the BATT and GEN terminals (See **Figure 9.2**).

9.10.3.4.4.4. Connect the aircraft battery. **WARNING:** The Essential DC bus cannot be isolated using bus isolation procedures contained in the flight manual. **Note:** When the #4 jumper wire is used on the RCR, the ISO DC on Batt/Batt Disc light will remain ON, even though the Essential DC bus is powering the Isolated Bus.

9.10.3.5. Failed Battery Relay.

9.10.3.5.1. DC power Switch – BATTERY.

9.10.3.5.2. Jump battery relay by momentarily touching terminals "A-1" to "A-2" using the #10 jumper wire (See **Figure 9.2**).

9.10.3.5.3. Check the battery voltage on voltmeter to verify closing of relay. (The voltmeter should read bus voltage.)

9.10.3.5.4. If battery relay fails to close, (as indicated by no bus voltage on DC volt meter) bypass the relay as follows:

9.10.3.5.4.1. Remove all power from the aircraft.

9.10.3.5.4.2. Disconnect the aircraft battery.

9.10.3.5.4.3. Install a #4 jumper wire between the A-1 and A-2 terminals (See **Figure 9.2**). **WARNING:** The ISOLATED DC bus cannot be isolated using bus isolation procedures. **Note:** When the #4 jumper wire is used on the RCR, the ISOL DC ON BATT/BATT DISC light will remain ON, even though the Essential DC bus is powering the Isolated Bus.

9.10.3.5.4.4. Connect the aircraft battery and INS battery. **WARNING:** Fire protection is not available for the APU until the aircraft battery bus is powered. If an engine fire or nacelle overheat is indicated and battery relay has opened, install a #4 jumper wire from terminals "A-1" and "A-2" to power the battery bus. **CAUTION:** When flying with a dead or otherwise disabled battery, ensure the DC Power Switch remains in the "BATTERY" position.

9.10.3.6. BSU #1 Failure Bypass Procedure (Used To Correct an Essential AC Avionics Bus Failure Resulting from a BSU #1 Failure) (See **Figure 9.12**).

9.10.3.6.1. Remove External Power.

9.10.3.6.2. Pull the BSU #1 Power, three phase, ESS AC Bus circuit breaker located on the pilot's side circuit breaker panel.

9.10.3.6.3. Pull the BSU #1 Power, three phase, Main AC Bus circuit breaker on the copilot's upper circuit breaker panel.

9.10.3.6.4. Pull the BSU #1 ESS DC control power circuit breaker located on the copilot's lower circuit breaker panel. **CAUTION:** When performing jump of BSU connectors J1 to J4 ensure proper phase connections are made (e.g., Phase A connected to Phase A). Crossing phases can cause damage to equipment.

9.10.3.6.5. Remove J1 and J4 cannon plugs from the #1 BSU (See **Figure 9.13**).

9.10.3.6.6. Install jumper wire on the cannon plugs removed from the #1 BSU (See **Figure 9.14**).

9.10.3.6.7. Reset circuit breakers.

9.10.3.6.8. Verify that the ESS AC Avionics Bus is powered.

9.10.3.7. BSU #2 Failure Bypass Procedure (Used To Correct a Main AC Bus Failure Resulting from a BSU #2 Failure).

9.10.3.7.1. Pull the BSU #2 Power, three phase, Main AC Bus circuit breaker located on the copilot's upper circuit breaker panel.

9.10.3.7.2. Pull the BSU #2 Power, three phase, ESS AC Bus circuit breaker located on the pilot's side circuit breaker panel.

9.10.3.7.3. Pull the BSU #2 ESS DC control power circuit breaker located on the copilot's lower circuit breaker panel. **CAUTION:** When performing jumping of BSU connectors J1 to J4 ensure proper phase connections are made (e.g., Phase A connected to Phase A). Crossing phases can cause damage to equipment.

9.10.3.7.4. Remove J1 and J4 cannon plugs from the #2 BSU (See **Figure 9.12**).

9.10.3.7.5. Install jumper wire on the cannon plugs from the #2 BSU (See **Figure 9.12**).

9.10.3.7.6. Reset circuit breakers.

9.10.3.7.7. Verify that the Main AC Avionics Bus is powered.

9.10.3.8. APU Door Fails to Actuate.

9.10.3.8.1. Remove power from aircraft.

9.10.3.8.2. Remove APU compartment access panel and unsnap the APU heat shield blanket in the upper compartment, or remove the APU door actuator panel located aft of the APU door.

9.10.3.8.3. Remove the actuator cannon plug and install it on the APU (failed actuator) start receptacle (See **Figure 9.7**).

9.10.3.8.4. If actuator is failed in the closed position, remove the actuator mount bolt from the fuselage and reposition the actuator to the INOP actuator position (See **Note 1, Figure 9.7**). **Note:** This will position the door to 35 degrees open for engine start only. It must be positioned to the closed position prior to flight. **(T-2)**

9.10.3.8.5. If the actuator is failed in an intermediate position, install the dummy actuator rod. **Note:** This will position the door to 15 degrees open for engine start.

9.10.3.8.6. Reinstall the heat shield blanket and secure the panel. **CAUTION:** During hot weather conditions, delay operation of the APU until immediately prior to engine start; then operate the APU only long enough to start one engine. **CAUTION:** APU operation in-flight with the door in the fixed flight position is not recommended since the door is part of the in-flight fire protection and provides fire containment within the fire proof area.

9.10.3.9. APU Fails to Rotate (Start Light Fails to Illuminate).

9.10.3.9.1. Check the following items:

9.10.3.9.1.1. APU control circuit breaker-IN.

9.10.3.9.1.2. APU fire handle-IN.

9.10.3.9.1.3. Isolated bus for available power.

9.10.3.9.2. If the above items are checked and in the normal operating configuration, the Auto Start Relay (ASR), upper relay on the APU is INOP (See **Figure 9.6**). Swap the ASR and the Fuel Holding Relay (FHR), lower relay and attempt another start.

9.10.3.10. APU Fails to Rotate (Start Light Illuminates).

9.10.3.10.1. Remove all electrical power from aircraft.

9.10.3.10.2. Open pilot's side circuit breaker panel.

9.10.3.10.3. Check APU current limiter, if bad or suspect, replace as follows (See **Figure 9.2**).

9.10.3.10.3.1. Disconnect the aircraft battery.

9.10.3.10.3.2. Remove and replace the current limiter with available spare.

9.10.3.10.3.3. If no spares are available, open the copilot's upper circuit breaker panel and remove the cargo winch current limiter and use as a replacement for the APU current limiter.

9.10.3.10.3.4. If the current limiter is good, check APU starter (See **Figure 9.6**) for broken wires and repair as necessary.

9.10.3.10.3.5. Connect the aircraft battery and attempt another start. If no rotation is noted, "tap" the start relay.

9.10.3.10.3.6. If APU still will not rotate, place the APU control switch to START momentarily, and then release the switch to RUN. Place a #4 jumper wire between post A-1 and post A-2 of the APU start relay until the start light goes out, then remove the jumper wire.

9.10.3.11. APU Rotates – Negative Ignition – No Ignition Noise.

9.10.3.11.1. Swap the FHR with the Auto Start Relay (ASR) (See **Figure 9.6**).

9.10.3.11.2. Attempt to start APU.

9.10.3.11.3. If APU fails to start – Remove oil pressure switch cannon plug and place a jumper wire from pins "A" to "B" (ignition) and another jumper wire from pins "C" to "E" (fuel). Secure with tape. **CAUTION:** Prior to jumping oil pressure switch, ensure oil pressure line from the pressure switch and motor the APU. Oil should spurt from the line if the pump is working.

9.10.3.11.4. Attempt to start the APU.

9.10.3.11.5. If APU does not start, the igniter, exciter, or ignition harness may be faulty.

9.10.3.12. APU Rotates – Negative Ignition – With Ignition Noise.

9.10.3.12.1. Manually open the APU motor operated fuel shutoff valve as follows: **Note:** APU shutoff valve is located in the aft outboard corner of the number two dry bay (tag ID "O").

9.10.3.12.1.1. Ensure the APU Control switch is in the "OFF" position.

9.10.3.12.1.2. Pull the APU Control circuit breaker on the isolated DC bus.

9.10.3.12.1.3. Remove the number 2 dry bay access panel.

9.10.3.12.1.4. Remove APU fuel shutoff valve cannon plug and secure.

9.10.3.12.1.5. Manually open the APU fuel shutoff valve.

9.10.3.12.1.6. Reinstall the number 2 dry bay panel.

9.10.3.12.2. Attempt to start APU.

9.10.3.12.3. If APU fails to start, swap the APU fuel control solenoid operated shutoff valve with the overspeed test solenoid located on the air shroud. Look on the inboard side of the APU behind and above the oil cooler (See **Figure 9.5**). **Note:** To shut down the APU, pull the fire handle.

9.10.3.13. APU Will Not Stay Running – After On Speed.

9.10.3.13.1. Disconnect forward bleed air pressure line from overspeed test solenoid valve, and plug with a number 4 plug (See **Figure 9.5**).

9.10.3.13.2. Start APU. If APU continues to run, the overspeed test solenoid is bad. **Note:** To shut down APU, pull the fire handle. **Note:** Reset fire handle after rotation stops to prevent aircraft battery drain. **Note:** The APU is protected from overspeed by the mechanical flyweight system in the centrifugal speed switch assembly.

9.10.3.14. Leaking Brake.

9.10.3.14.1. Disconnect brake lines from both sides of the brake shuttle valve.

9.10.3.14.2. Use plugs and caps from the HERK to seal the brake lines and shuttle valve. **Note:** This step does not apply to aircraft modified by T.O. 1C-130-2098F (Carbon Brakes).

9.10.3.14.3. Secure disconnected hose ends to prevent interference with landing gear movement during retraction and extension. **Note:** Both landing and takeoff performance calculations will be affected by a disconnected brake. Use RCR of 5 for all performance calculations.

9.10.3.15. Moving an Aircraft with Flat Main Landing Gear Tire. **WARNING:** Use this procedure only as a last resort to move an aircraft out of a hostile environment. Reduce aircraft weight as much as possible by unloading cargo, defueling, or burning off fuel. Some fuel may be transferred out of the wing corresponding to the flat tire and into the opposite wing. Be aware of wing tip and propeller ground clearance.

9.10.3.15.1. Install main gear towing/jacking fitting on the strut with the flat tire.

9.10.3.15.2. Install a 10,000 lb. chain around the top of the strut with the flat tire.

9.10.3.15.3. Connect a tiedown device to the towing fitting. Connect the chain to the device and tighten.

9.10.3.15.4. Open the Schrader valve at the top end of the Main Landing Gear (MLG) strut and bleed all air pressure from the strut. **WARNING:** Do not open Schrader valve more than ¾ of a turn. It may be necessary to use the valve stem to bleed the pressure from the strut. Do not allow the lower nut to loosen. If the lower nut becomes loose it may allow the Schrader valve to blow out of the strut body.

9.10.3.15.5. Compress the strut by any means possible such as the use of a “J” bar, chocks, milk stool or taxiing the aircraft onto shoring in order to elevate the flat tire.

9.10.3.15.6. When the strut has been compressed to the maximum extent possible, tighten the tiedown device.

9.10.3.15.7. Remove the flat tire if time and situation permits.

9.10.3.15.8. Flight should be made with the landing gear extended and the landing gear control circuit breaker pulled. When safely airborne, pull the touchdown relay circuit breaker. Refer to the flight manual for airspeed limitations with landing gear extended. After landing, reset the touchdown relay circuit breaker.

9.10.3.16. Failed Engine Driven Hydraulic Pump

9.10.3.16.1. Disconnect the failed engine driven hydraulic pump from the gearbox and secure to any available structure with safety wire. Do not disconnect hydraulic lines.

9.10.3.16.2. Install a starter pad in place of the failed hydraulic pump (See **Figure 9.9**).

9.10.3.16.3. If time and resources permit, the pump may be removed from the nacelle as follows:

9.10.3.16.3.1. With the ESS DC bus powered, place the corresponding hydraulic pump switch to the OFF position. This will close the hydraulic shutoff valve.

9.10.3.16.3.2. Disconnect and plug all hydraulic lines to the pump.

9.10.3.16.3.3. Remove the failed pump and install a starter pad in its place. **CAUTION:** The hydraulic pump switch must remain in the OFF position as long as the hydraulic pump is removed. **(T-3)**

9.10.3.17. Failed Fuel Valve(s)

9.10.3.17.1. Locate the failed valve(s) and remove the cannon plug(s).

9.10.3.17.2. Manually open or close the valve(s) by actuating the manual arm. **Note:** On some aircraft, the dump mast shutoff valves must be manually closed to refuel.**(T-3)** Ensure these valves are reopened prior to flight.

9.10.3.18. Failed Speed Sensitive Switch. **Note:** The engine will not airstart once it is shutdown in-flight.

9.10.3.18.1. Pull Ignition Control circuit breaker on copilot's power circuit breaker panel. **Note:** Any time the Ignition Control circuit breaker is pulled on an inboard engine, the ice detection system is INOP.

9.10.3.18.2. Open lower left side engine cowling on the affected engine.

9.10.3.18.3. Remove the speed sensitive control cannon plug (See **Figure 9.8**).

9.10.3.18.4. Install the pre-wired cannon plug from the HERK and secure it in place (See **Figure 9.8** and **Figure 9.10**). **CAUTION:** Pre-wired cannon plugs used as jumpers must be wired as shown in **Figure 9.10**. **(T-3)**

9.10.3.18.5. Secure all engine cowlings.

9.10.3.18.6. Begin the start sequence (in normal ground idle) while monitoring tachometer.

9.10.3.18.7. At 16% engine Revolutions per Minute (RPM), reset the Ignition Control circuit breaker.

9.10.3.18.8. At 94% engine RPM, pull the Ignition Control circuit breaker. **Note:** The secondary fuel pump pressure light will be illuminated and the pumps will be in parallel operation until the Ignition Control circuit breaker is pulled.

9.10.3.18.9. After landing, use normal ground idle only and shutdown the affected engine as follows:

9.10.3.18.9.1. Ignition Control circuit breaker – RESET.

9.10.3.18.9.2. Condition Lever – GROUND STOP. **Note:** When the Ignition Control circuit breaker is reset prior to engine shutdown, approximately two seconds is required for the fuel control shutoff valve to close. If the engine continues to run when the condition lever is placed in GROUND STOP, place the Condition Lever to FEATHER.

9.10.3.18.9.3. When the fuel flow indicator drops to zero and RPM is decreasing, pull the Ignition Control circuit breaker.

9.10.3.19. Failed Ignition Control Relay.

9.10.3.19.1. Pull the Ignition Control circuit breaker. **Note:** Any time the ignition control circuit breaker is pulled on an inboard engine, the ice detection system is INOP.

9.10.3.19.2. Open the lower left engine cowling and locate the Ignition Control Relay (See **Figure 9.8**).

9.10.3.19.3. Disconnect the cannon plug from the relay and install the pre-wired cannon plug from the HERK. **CAUTION:** Pre-wired cannon plugs used as jumpers must be wired as shown in **Figure 9.10**. **(T-2)**

9.10.3.19.4. Close and secure cowling.

9.10.3.19.5. Start the engine in Normal Ground Idle and proceed as follows:

9.10.3.19.5.1. At 16% engine RPM, reset the Ignition Control circuit breaker.

9.10.3.19.5.2. At 65% engine RPM, pull the Ignition Control circuit breaker.

9.10.3.19.6. For engine shutdown following landing, proceed as follows:

9.10.3.19.6.1. Reset the Ignition Control circuit breaker.

9.10.3.19.6.2. Place the Condition Lever to GROUND STOP.

9.10.3.19.6.3. When fuel flow drops to zero and RPM decreases, pull the Ignition Control circuit breaker.

9.10.3.20. Failed Speed Sensitive Valve. **CAUTION:** This procedure will render the torquemeter shroud anti-icing system INOP. Icing conditions should be avoided.

9.10.3.20.1. Open the lower left side engine cowling on the affected engine.

9.10.3.20.2. Disconnect the air supply line to the speed sensitive valve (See **Figure 9.8**) at the bottom of the filter element installed in the line and install a #6 plug in the open line. **WARNING:** Install only the AN806S6 plug stock number 4730007629456. Using improper plug may result in a bleed air leak and engine power loss.

9.10.3.20.3. Disconnect the torquemeter shroud anti-icing at the left side of the balance line fitting and secure it.

9.10.3.20.4. Disconnect the line from the top side of the speed sensitive valve and connect it to the balancing line fitting where the torquemeter shroud anti-icing was connected.

9.10.3.20.5. Secure any loose hardware then close and secure engine cowling. **Note:** Do not start the affected engine first. Select another engine for the first engine to be started in order to supply bleed air to the affected engine.

9.10.3.20.6. Place the Engine Inlet Duct Anti-icing switch for the affected engine to ON.

9.10.3.20.7. Start the affected engine while watching RPM and stand by to activate the Prop and Engine Anti-icing Master Switch.

9.10.3.20.8. At 94% engine RPM, place the Prop and Engine Anti-icing Master switch to MANUAL. The acceleration bleed valves should close at this time. **WARNING:** When the Prop and Engine Anti-icing Master switch is selected to the MANUAL position, the engine anti-ice and prop anti-ice/de-ice systems will be actuated if their respective switches are turned on. These switches are normally turned on during the Before Takeoff Checklist but should be delayed using this procedure unless absolutely necessary for safe operation. Turning these switches to the ON position with the Prop and Engine Anti-icing Master switch selected to MANUAL will activate the systems and rob the engines of torque. Overheating of the blade/spinner anti-ice/de-ice systems will occur if the aircraft remains on the ground for longer than the two cycle operating limit. **Note:** In this configuration the affected engine will have continuous anti-icing and an associated reduction in torque will be noted.

9.10.3.20.9. After landing, shutdown the engine in NORMAL GROUND IDLE. **CAUTION:** Do not use ―LOW SPEED GROUND IDLE during ground operations. To do so may cause the engine to stall/over temperature.

9.10.3.21. Failed Fuel Shutoff Valve on Fuel Control.

9.10.3.21.1. Open lower left side cowling on affected engine.

9.10.3.21.2. Remove the defective fuel control shutoff actuator (Geneva lock) from the fuel control (See **Figure 9.8**).

9.10.3.21.3. Insert a small common screwdriver into the spline end of the fuel control and rotate in a counterclockwise direction until the fuel control opens.

9.10.3.21.4. Close the engine cowling and secure all fasteners. **Note:** During engine start, abnormal situations such as excessive fuel coming from drain mast, tailpipe torching and a higher than normal start TIT can be expected.

9.10.3.21.5. For engine shutdown, place the condition lever to FEATHER rather than GROUND STOP for the affected engine.

9.10.3.22. Failed Engine Fuel Drip Valve. **Note:** Prior to using this procedure, use enrichment on next engine start. The sudden surge of pressure should close the drip valve. If enrichment fails to close the drip valve, shutdown the engine and plug or crimp the drip valve drain line closed.

9.10.3.23. Prop Fails To Rotate (No Light In Button) (APU Equipped aircraft, Engine Ground Start Interlock Relay Defective).

9.10.3.23.1. Pull the start control and oil shutoff valve circuit breakers.

9.10.3.23.2. Locate the Ground Start Interlock Relay on the aft upper right side of Flight Station (FS) 245.

9.10.3.23.3. Disconnect wire on "A1" terminal of relay and reconnect it to "A2" terminal with existing wire.

9.10.3.23.4. Reset start control and oil shutoff valve circuit breakers and attempt start.

9.10.3.24. Failed Bleed Air Valve (Engine Fails To Rotate).

9.10.3.24.1. Place the bleed air valve switch to "OPEN." Open horse collar and "tap" the motor mechanism on the bleed air valve.

9.10.3.24.2. If the valve still fails to open, remove the motor from the valve. Manually open the valve and secure the lever to one of the mount holes with safety wire. **WARNING:** Once bleed air valve has been secured in the open position, it will not be possible to close the valve for wing isolation procedures. Engine shut down will be required to isolate the wing.

9.10.3.24.3. Close the horse collar and attempt engine start.

9.10.3.25. Failed Bleed Air Regulator (Engine Fails To Rotate).

9.10.3.25.1. Pressurize bleed air manifold. **Note:** Bleed air regulators require bleed air to operate.

9.10.3.25.2. Place bleed air regulator switch to "OVERRIDE."

9.10.3.25.3. Open horse collar and "tap" the Bleed Air Regulator Valve.

9.10.3.25.4. If valve still fails to open, manually lock the valve in the "OPEN" position. **WARNING:** Once the bleed air regulator has been locked in the open position, it will not be possible to close the valve for wing isolation procedures.

9.10.3.26. Severe Fuel Leaks. Fuel leaks caused from punctures or small arms fire can be plugged by using the wooden plugs and Pig Repair Putty from the HERK. If a high number of plugs are used, it may be necessary (as time permits) to break or cut them off near the wing surface to reduce drag.

Table 9.1. Hostile Environment Repair Kit (HERK) Parts List.

HOSTILE ENVIRONMENT REPAIR KIT INVENTORY LIST	
Note: STOCK NUMBERS MAY CHANGE WITHOUT NOTICE. NUMBERS SHOULD BE VERIFIED WITH SUPPLY ORGANIZATIONS WHEN ORDERING.	
ITEM	**National Stock Number (NSN)**
1. ELECTRICAL TAPE	5970004194291
2. VISE GRIP PLIERS, 8 ½ inch (2 EA.)	5120004941911
3. ALLEN WRENCH, 5/32, 6 point (long)	5120001985413
4. CHANNEL LOCK PLIERS, 10 inch	5120002780352
5. GENEVA LOCK WRENCH	5120007158467
6. STARTER WRENCH	5120006843605
7. SMALL BLADE COMMON SCREWDRIVER	5120002363127
8. IGNITION RELAY CANNON PLUG	5935000139655

9. SPEED SWITCH CANNON PLUG	5935012309542
10. BRAKE SHUTTLE VALVE PLUG, #6 MS (2 EA.)	4730002033709
11. BRAKE PLUG, #8 MS (2 EA.)	4730002028341
12. BRAKE LINE CAP, #8 (2 EA.)	4730002898634
13. PIG REPAIR PUTTY (REPLACES OYLTYTE)	8030012652895
14. WIRE BUNDLE TIES (20)	5975010132742
15. WOOD PLUG (LARGE)	5510002559492
16. WOOD PLUG (SMALL)	5510002559493
17. BRASS BAR, 7/16 (STOCK BY FOOT) (Cut two 4 inch lengths per kit)	9530002289235
18. BRASS BAR, 3/8 (STOCK BY FOOT) (Cut two 4 inch lengths per kit) (Use with Maintenance Free Battery)	9530002289234
19. BRASS BAR, 5/16 (STOCK BY FOOT) (Cut one 2 inch length per kit)	9525002289233
20. #10 GAUGE WIRE WITH ALLIGATOR CLAMPS A. 16 INCH WIRE (ORDER BY FOOT) B. ALLIGATOR CLAMPS (PACK OF 6 EA.)	6145006006051 5999002045206
21. #16 GAUGE JUMPER WIRE WITH TERMINALS (2 EA.) A. 7 INCH WIRE (ORDER BY FOOT) *B. PINS FROM SPEED SWITCH CANNON PLUG	6145000138651 5935012309542
22. #4 GAUGE JUMPER WIRE WITH TERMINALS (18 INCHES LONG) A. WIRE (ORDER BY FOOT) B. 3/8 INCH TERMINALS	 6154007563030 5940005574338
23. #16 GAUGE JUMPER WIRE WITH TERMINALS (10 INCHES LONG) A. WIRE (ORDER BY FOOT) B. TERMINALS #10 (PACK OF 50 EACH)	 6145000138651 59400014347780
24. OVERSPEED SOLENOID VALVE CAP, #4 (1 EA.)	4730002785006
25. OVERSPEED SOLENOID VALVE PLUG, #4 (1 EA.)	4730005424994
26. #10 WIRE AND CANNON PLUGS WIRED TO BYPASS BSU (12 INCHES LONG) A. WIRE (ORDER BY FOOT) B. CONNECTOR C. CONNECTOR	6145006006051 5935011865487 5935011686755
**27. APU DUMMY ACTUATOR ROD A. BEARING END APU ACTUATOR ROD B. NUT, APU ACTUATOR ROD END	3120001071678 5310008810944
28. SPEED SENSITIVIE VALVE BLEED AIR LINE #6 PLUG AN806S6 (1 ea.).	4730007629456.
29. FUNNEL ASSEMBLY (Funnel does not have to be stored inside the kit as long as it is secured on the aircraft.)	4920-01-559-1292

* Cannon plug must be ordered and the pins removed from the plug for use. **(T-3)** Each cannon plug contains six pins.

** The APU dummy actuator rod must be locally manufactured in accordance with T.O. 1C-130H-2-00GE-00- 1, **Figure 5-26**. **(T-3)**

Figure 9.1. Alternate DC Power Connections.

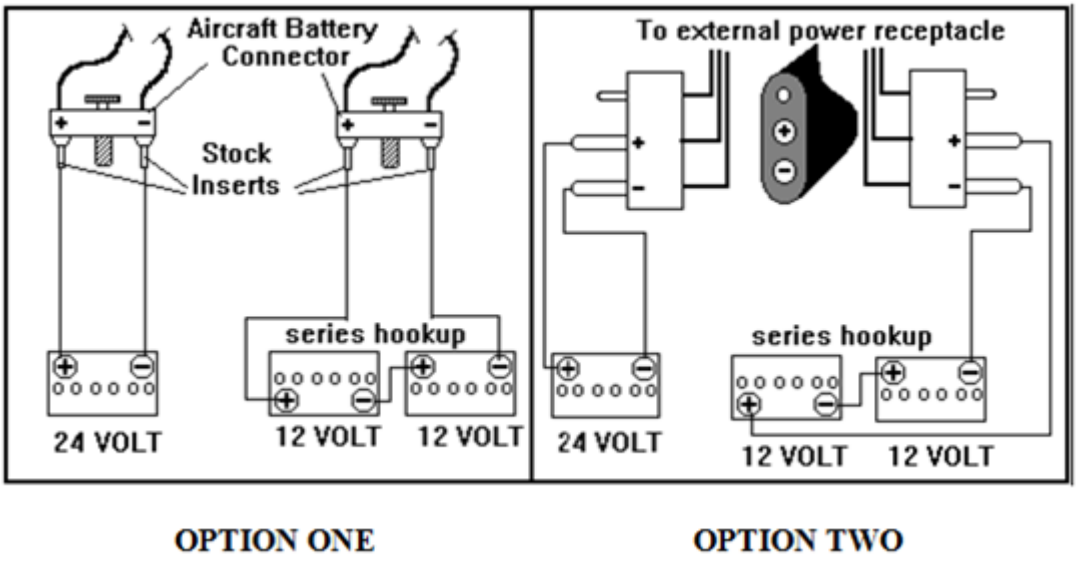


Figure 9.2. Reverse Current Relay.

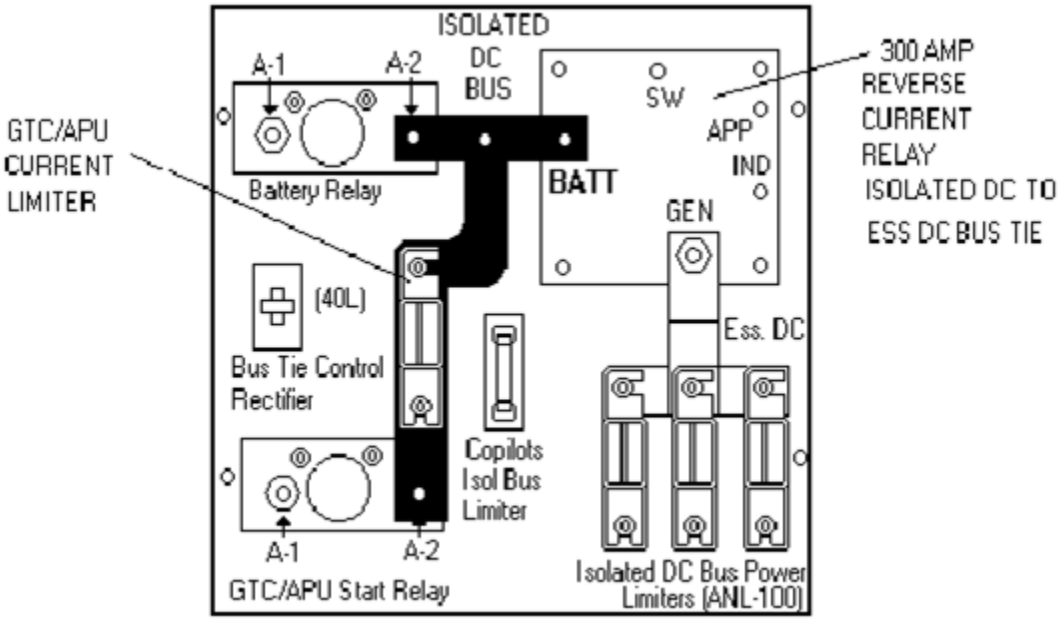


Figure 9.3. APU (Right Side View).

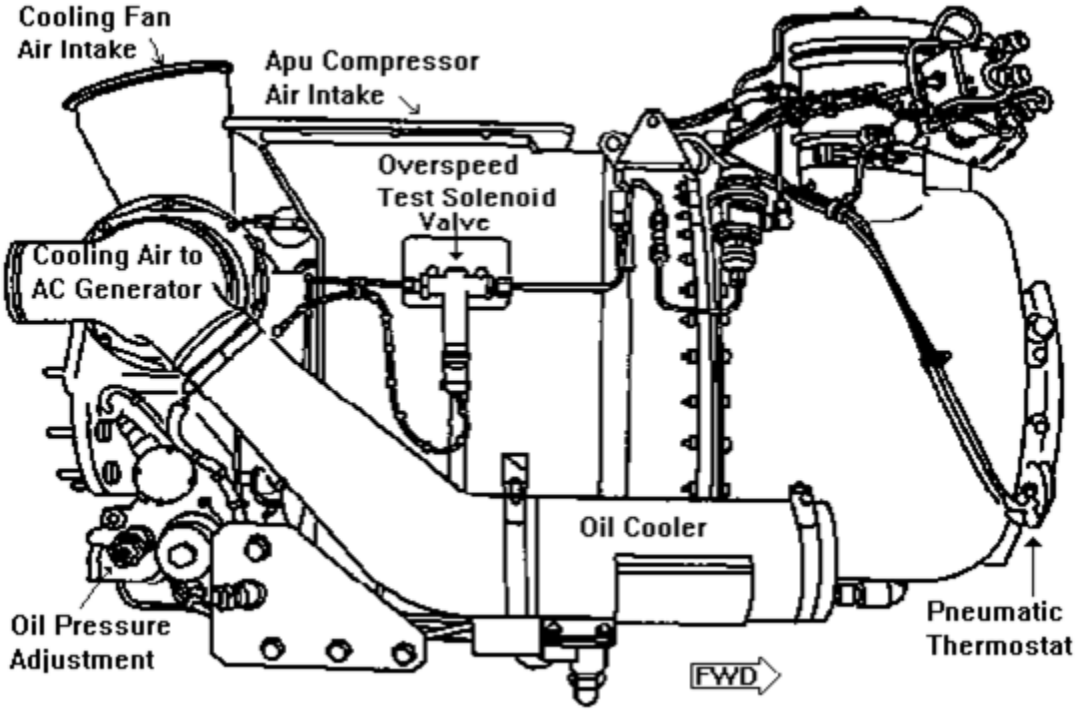


Figure 9.4. APU (Right Side View).

1. Overspeed test solenoid valve.
2. Cooling shroud.
3. Drain hose for exhaust port.

Figure 9.5. APU (Left Side View).

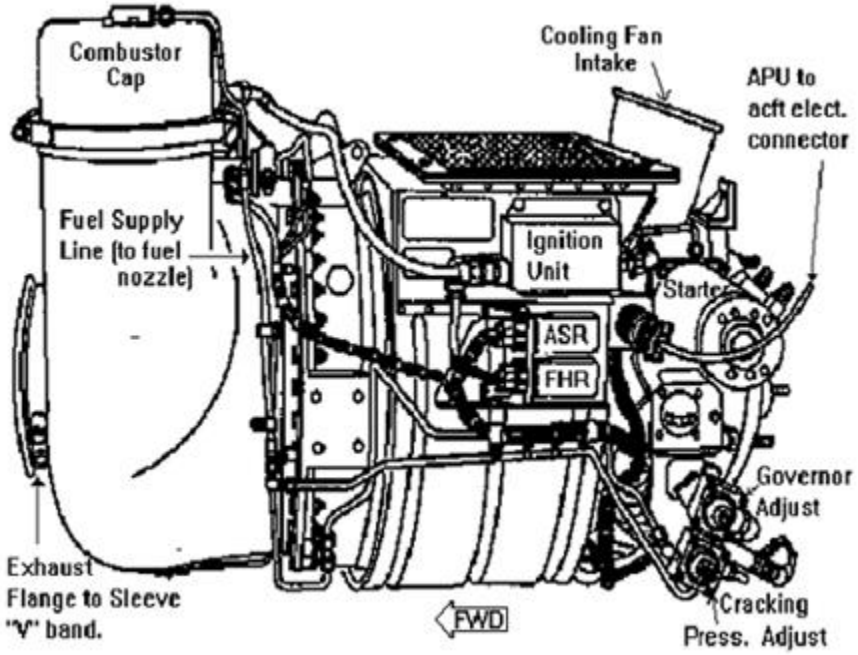
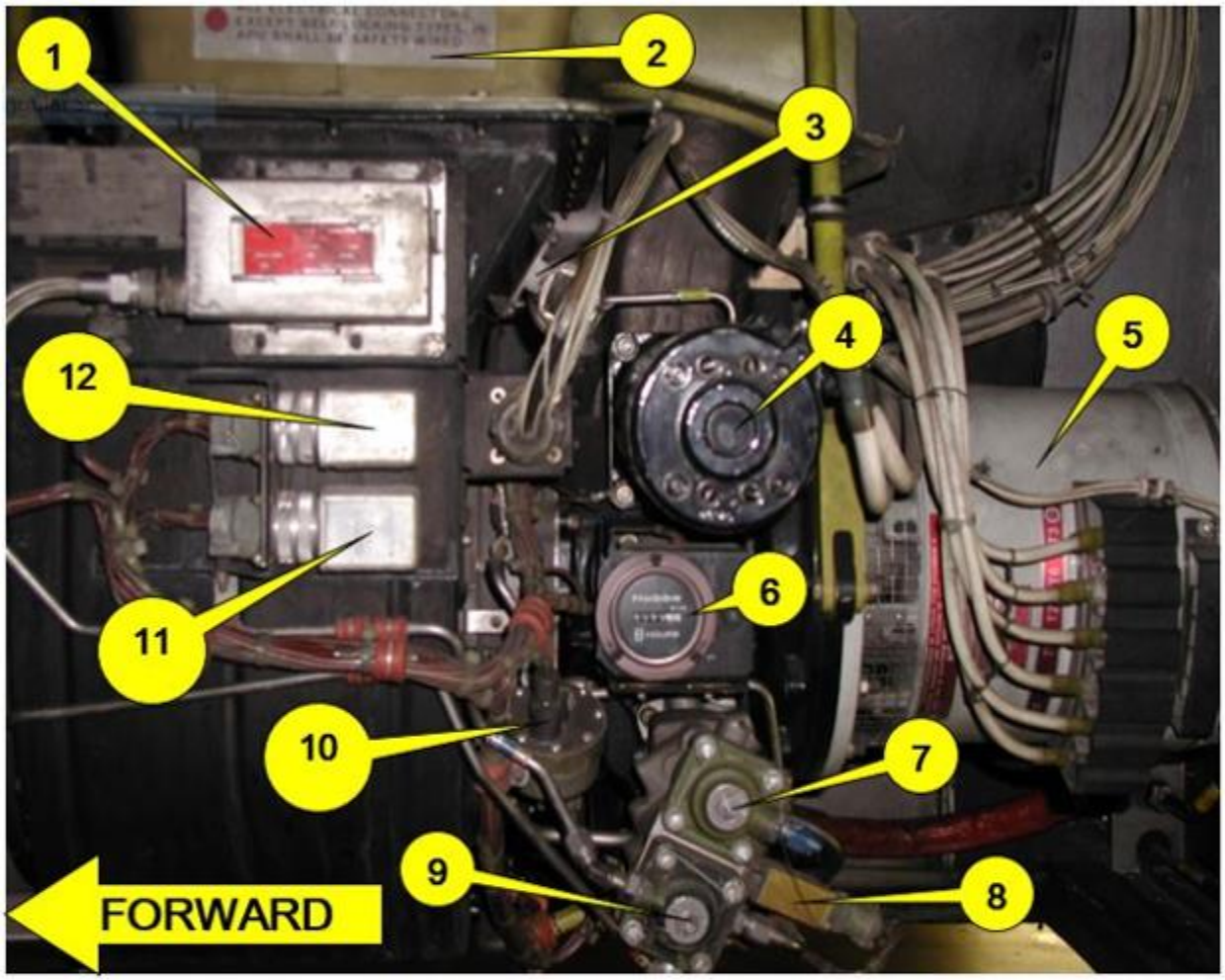


Figure 9.6. APU (Left Side View).



1. Ignition exciter
2. Main air intake
3. Door pressure switch
4. Starter
5. Generator
6. Hour meter
7. Governor adjust
8. Fuel control shut off valve
9. Cracking pressure adjust
10. Oil pressure switch
11. Fuel holding relay (FHR)
12. Auto start relay (ASR)

Figure 9.7. APU Inlet Door Assembly.

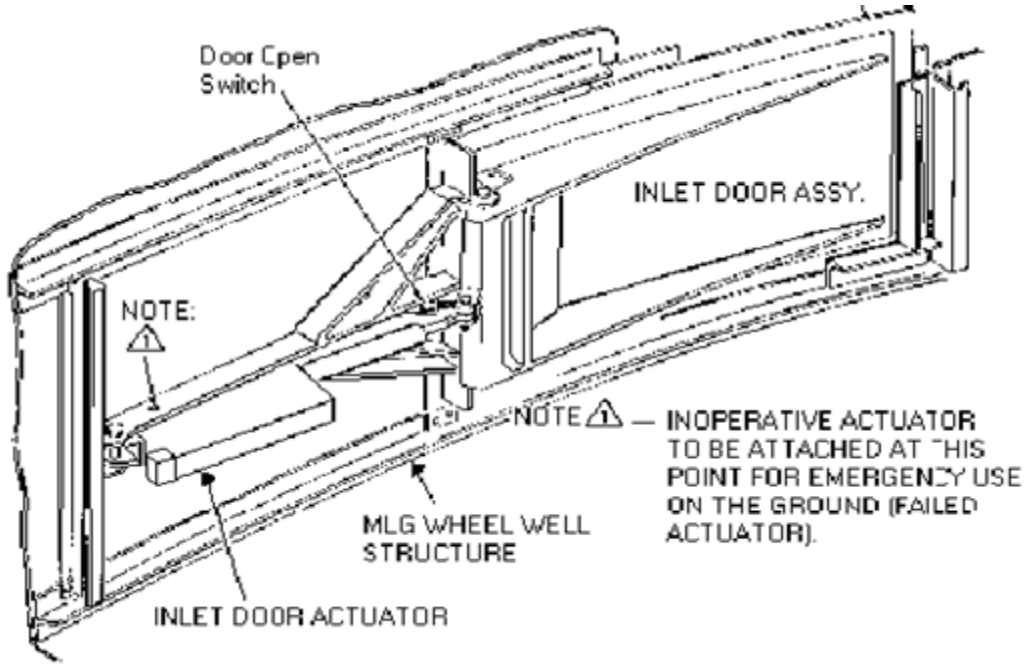
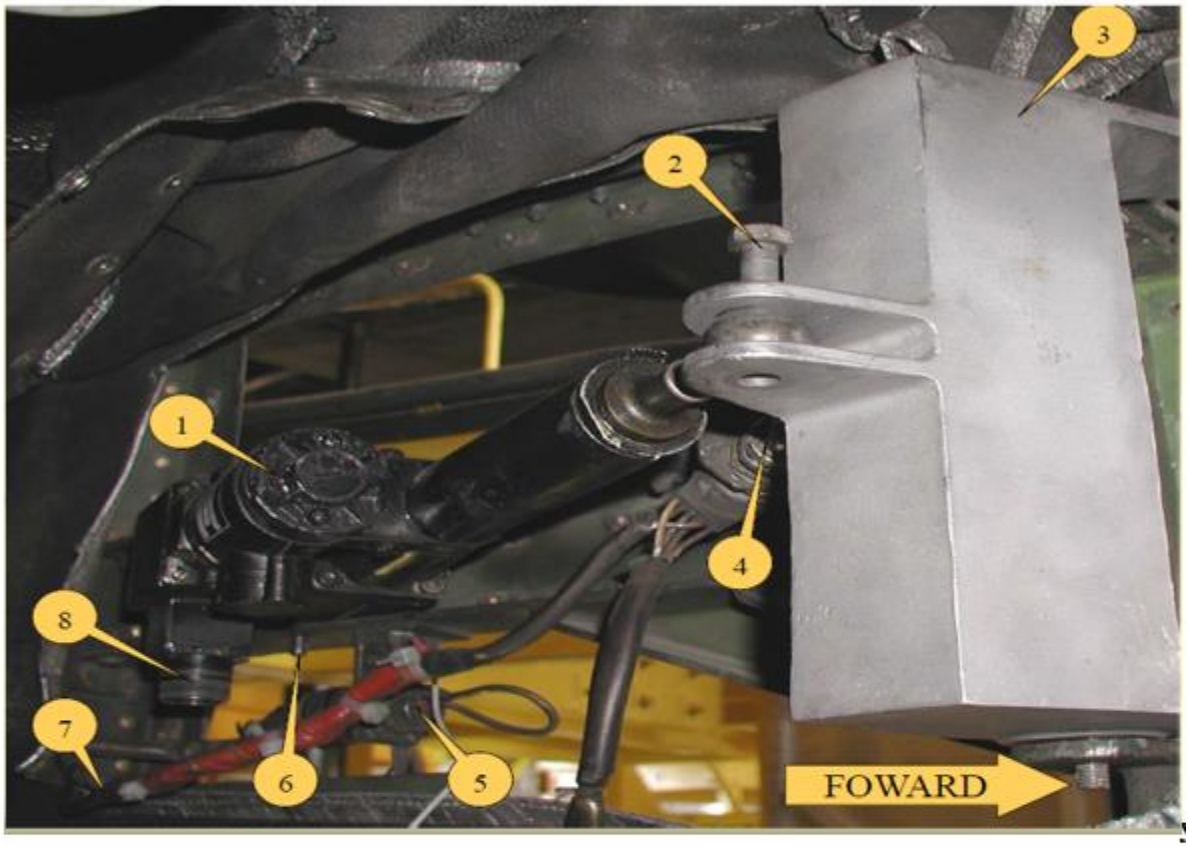


Figure 9.8. APU Inlet Door Assembly.



1. APU door actuator.
2. Actuator forward mounting bolt.
3. APU door.
4. APU door open micro switch.
5. Failed actuator start receptacle.
6. Actuator aft mounting bolt.
7. Actuator electrical harness (disconnected).
8. Actuator electrical connection.

Figure 9.9. Engine Accessory Locations.

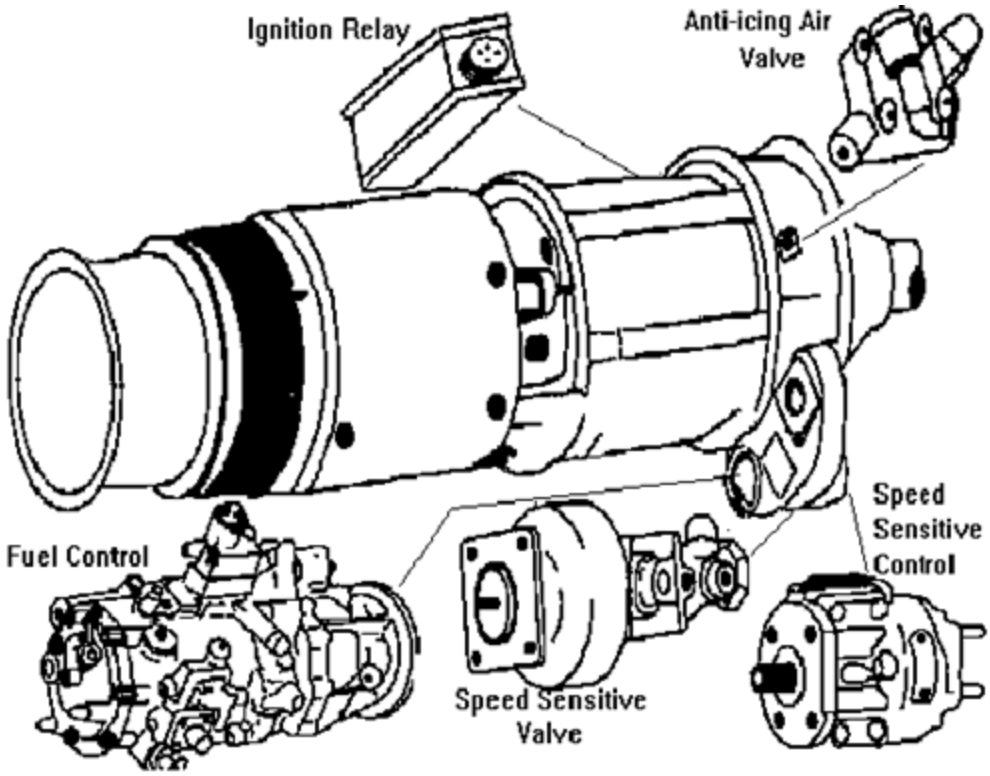


Figure 9.10. Gear Box Accessory Locations.

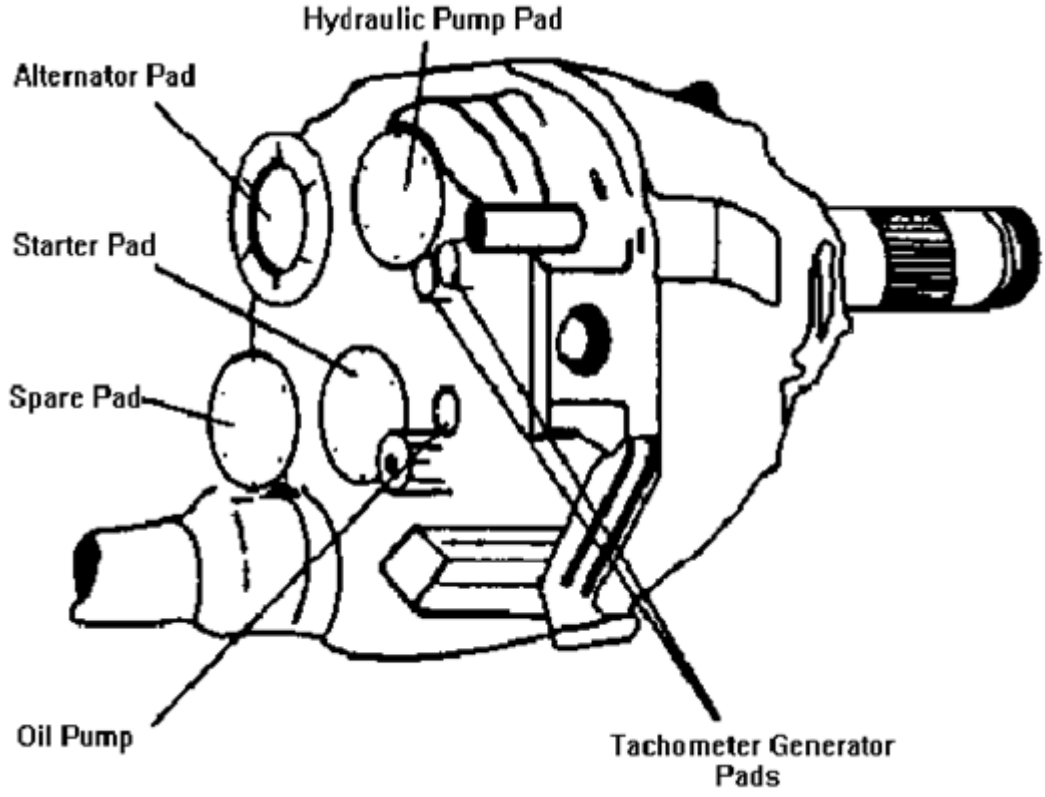


Figure 9.11. Prewired Cannon Plugs (Speed Sensitive Control and Ignition Relay).

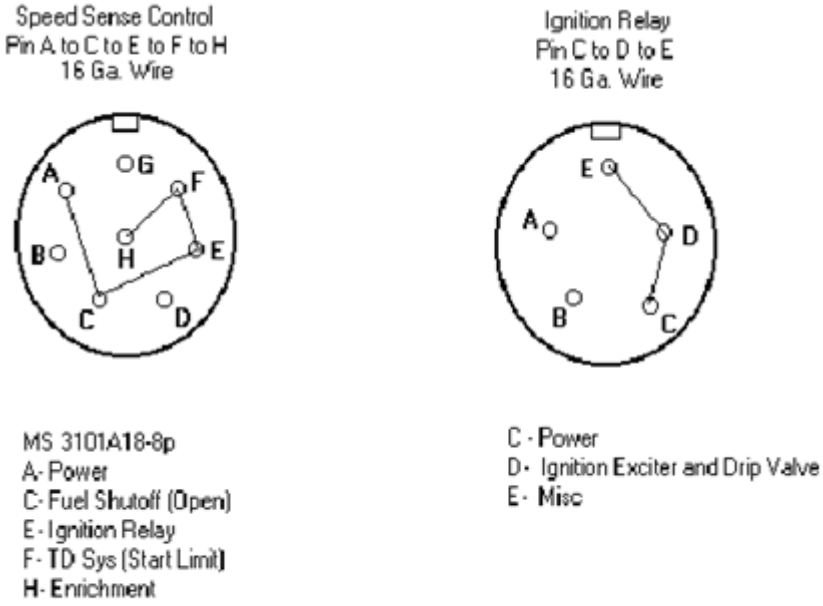


Figure 9.12. Bypassing the INS Reverse Current Relay.

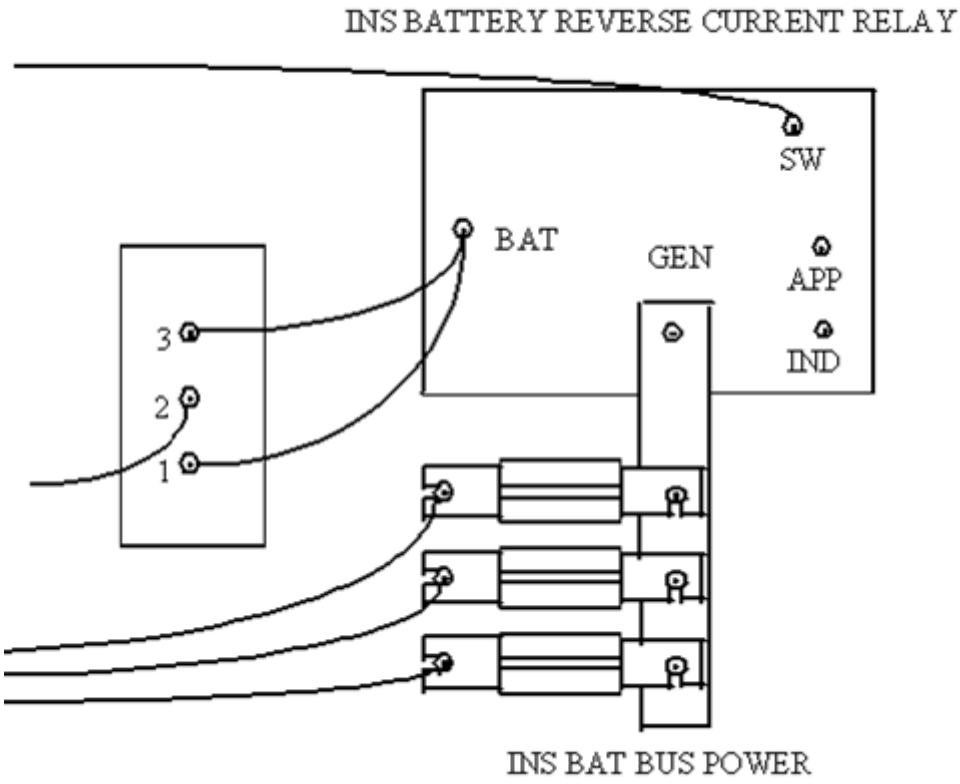
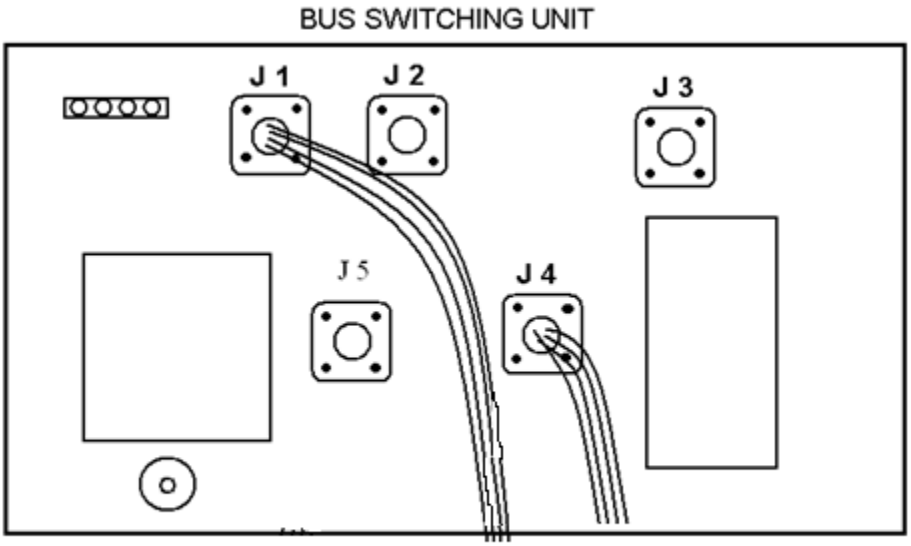
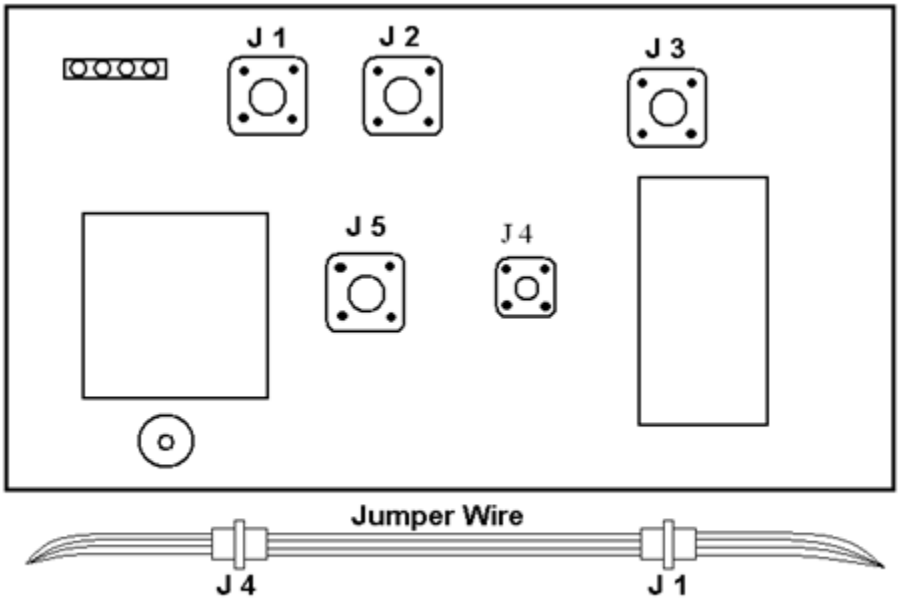


Figure 9.13. Jumping Bus Switching Unit (BSU).



Remove cannon plugs from the J1 and J4 connectors



Install Jumper Wire between cannon plugs removed from J1 and J4

Figure 9.14. BSU #1 Cannon plug.

FROM J1 (P1722A)	TO J4 (P1719A)
PIN A	PIN A
PIN B	PIN B
PIN C	PIN C

Figure 9.15. BSU#2 Cannon Plug.

FROM J1 (P1722B)	TO J4 (P1719B)
PIN A	PIN A
PIN B	PIN B
PIN C	PIN C

Chapter 10

CARGO AND PASSENGER HANDLING PROCEDURES

10.1. General. Reference AFMAN 11-202V3, applicable supplements, and this chapter for all cargo and passenger handling procedures. The loadmaster coordinates and supervises loading and offloading with air terminal operations or shipping agencies. Loadmasters also perform preflight and postflight inspections of aircraft systems, plan loads, and compute aircraft weight and balance. In addition, loadmasters provide for the safety and security of passengers, troops, cargo, mail, and baggage during flight. During airdrop operations, the loadmaster prepares and rigs equipment, and participates in the aerial delivery of equipment, supplies, and personnel. To ensure good CRM, the primary loadmaster will assume overall responsibility for completion of all checklists and ensure no confusion exists about what duties have been or need to be accomplished when multiple loadmasters are on the crew. **(T-3)**

10.2. Responsibilities for Aircraft Loading.

10.2.1. Aerial port personnel are responsible for selecting cargo and mail for airlift, promptly completing documentation, palletizing cargo, load planning, computing load distribution, and moving cargo to and from the aircraft to meet scheduled departure. They will advise the loadmaster of destination, size, weight, and type of cargo (classified, hazardous, etc.) before starting loading operations to permit proper positioning. **(T-3)** They will also coordinate traffic activities affecting loading and offloading and assign sufficient aerial port loading personnel for cargo handling. **(T-3)** Aerial port personnel are responsible for safe positioning of material handling equipment (MHE) and cargo to or from the aircraft cargo door, ramp, or auxiliary ground loading ramps. Under supervision of the loadmaster, aerial port personnel may assist with the following: preparing the aircraft for loading, stowing loading/tie-down equipment if the aircraft is not to be reloaded, physically loading the aircraft and tying down cargo and equipment, as well as releasing cargo that is tied-down and physically offloading it.

10.2.2. The loadmaster is responsible for aircraft preflight, load planning, certifying load plans, operating aircraft equipment, supervising and directing loading and offloading operations, and cargo tie down. Loadmasters are also responsible for completing weight and balance documentation in accordance with AFMAN 11-2C-130HV3 Addenda A, *C-130 Operations Configuration/Mission Planning*. The loadmaster coordinates with the load team chief to verify cargo against manifests, supervises and directs loading operations, and is responsible for safe movement of cargo into and out of the aircraft. The loadmaster will notify the PIC, command post, or terminal operations officer if loading personnel are injured or cargo, aircraft equipment, or aircraft structure is damaged during loading or offloading. **(T-3)**. The loadmaster will brief the PIC on any hazardous cargo and cargo jettison ability prior to engine start. **(T-3)**.

10.2.3. Loads planned by qualified load planners will be accepted by the aircraft loadmaster and loaded aboard the aircraft as planned, unless the load or any portion of it will compromise flight safety. **(T-3)**. If cargo is refused for these reasons, forward all applicable information, including a copy of the load plan, to MAJCOM Stan/Eval. AMC personnel attach an AMC Form 54, *Aircraft Commander's Report on Services/Facilities*. **(T-3)**. **Exception:** The aircraft loadmaster may deviate from load plans to facilitate ease of onload or offload of cargo and to alleviate unnecessary aircraft reconfiguration without submitting documentation. The aircraft

loadmaster must take into consideration the next station's cargo configuration requirements and will ensure the aircraft is in proper weight and balance limits. **(T-3)**. A new load plan is not required if cargo is not refused.

10.2.4. The loadmaster is the on-scene expert for load planning and accepting cargo for airlift. Some loads are not specifically detailed in applicable directives and require the loadmaster to use their best judgment, based on training, experience, and knowledge, to determine the best and safest method of loading the cargo. When difficulties arise, they should seek advice of other personnel (e.g. available loadmasters and squadron, group, wing, Numbered Air Force (NAF), or MAJCOM Stan/Eval personnel).

10.3. Emergency Exits and Safety Aisles. In addition to AFMAN 11-202V3 and applicable supplements, reference AFMAN 11-2C-130HV3, Addenda A.

10.3.1. When passengers are seated in side facing seats, the loadmaster will ensure there is sufficient space between the cargo and the seats to permit passenger leg room. **(T-3)**.

10.3.2. Passengers/ambulatory patients may not be seated closer than 30 inches in front of palletized netted cargo or cargo secured with straps. **(T-3)**. When the cargo, either palletized or non-palletized, is secured with chains, the 30-inch spacing is not required. **Exception**: Maintain 30-inch spacing on AE missions, when carrying occupied litters. **(T-3)**.

10.4. Pre-Mission Duties.

10.4.1. Cargo Missions.

10.4.1.1. Loadmasters establish loading times in coordination with aerial port personnel. Loading times that differ from the normal pre-departure sequence will be established with PIC coordination before the loadmaster enters crew rest. **(T-3)**. Loading time is governed by the type of load and complexity of loading procedures (bulk, palletized, etc.) -- not by port saturation or management of aerial port workload levels. When reporting for duty, the loadmaster checks in with the air terminal operation center (ATOC) or other designated location to obtain load breakdown and assist in load planning as required.

10.4.1.2. Known tiedown equipment deficiencies.

10.4.1.2.1. Davis 08/08 CGU-3/E 25K tiedown device. Prior to use, ensure tiedown devices with manufacture date of "08/08" have a repair kit installed. **(T-2)**. Repair kits consist of a keeper plate on top side of release handle attached with three Philips head screws.

10.4.1.2.1.1. Upgrade kits are needed to correct the locking interface operation for these devices. **(T-2)**. Any devices that have not been repaired with these kits are not authorized for use. **(T-2)**. If found, remove the device from service.

10.4.1.2.1.2. The following information can be located on the release handle of the effected devices: NSN 1670-00-212-1150, manufactured by Davis Aircraft Products Incorporated under contract SPM4A7-08-D-0160, with a manufacture date of 08/08.

10.4.1.2.2. Peck and Hale CGU-4/E 10K tiedown device. The chain can be pulled out of clasp on these devices once locked. This can be accomplished by pulling on the excess chain (free end) while locked into the chain pocket of the device.

10.4.1.2.2.1. Inspect for the following condition after applying tension on the device: ensure chain is properly locked into the chain pocket and quick release lever is not oriented in a downward position; pull on excess chain (free end). **(T-2)**.

10.4.1.2.2.2. If chain comes out of the pocket, remove the device from service. **(T-2)**.

10.4.1.2.3. Davis CGU-4/E 10K device. The chain can be pulled out of the pocket when significant slack is present. This can be accomplished by pulling the loaded end of the chain away from the device, while locked into the chain pocket. The defect is amplified when the chain pocket/quick release lever is facing down. Based on a risk analysis by WR-ALC 642 CBSG, the chance of failure is minimal when the device is under tension and the chain pocket/quick release lever is not oriented in a downward position.

10.4.1.2.3.1. Inspect for the following condition after applying tension on the device: ensure chain is properly locked into the chain pocket and quick release lever is not oriented in a downward position; pull on the loaded end of the chain. **(T-2)**.

10.4.1.2.3.2. If chain comes out of the pocket, remove the device from service. **(T-2)**.

10.4.2. Passenger Missions.

10.4.2.1. All passenger briefing(s) contained in Flight Manual(s)/checklist(s) will be accomplished for any mission with passengers aboard regardless of passenger category (e.g. DV, Duty passenger, Space Required passenger, Space available passenger, MEP) or manifest documenting method (passenger manifest, flight orders, etc.). **(T-1)**

10.4.2.2. The design of the sidewall seatbelt makes it difficult to remove enough slack to secure the Infant Car Seat (ICS). Crewmembers may need to reroute the seatbelt by crossing the belt, between the sidewall and the seatback webbing, routing the belt back through the webbing and through the securing point on the ICS. When removing slack from the seatbelt ensure the buckle remains on one side or the other so that it can be easily accessed for release. The PIC is the final authority for determining whether the ICS is adequately secured.

10.5. Enroute and PostFlight Duties.

10.5.1. At stations where a crew change is made and loading or offloading is required, the inbound loadmaster is responsible for offloading the aircraft. The outbound loadmaster is responsible for planning and loading the outbound load. When no crew change occurs, the inbound loadmaster is responsible for onloading or offloading cargo. **(T-2)**

10.5.2. Assist passengers in deplaning. If BLUE BARK, Distinguished Visitors (DVs), COIN ASSIST, or couriers are onboard, the loadmaster informs the traffic or protocol representative respectively. **(T-3)** Refer to the General Planning (GP) Flight Information Publication (FLIP) for DV codes.

10.6. Loaded Weapons. Weapons are considered loaded if a magazine or clip is installed in the weapon. This applies even though the clip or magazine is empty.

10.6.1. Personnel who will engage an enemy force immediately on arrival (actual combat) may carry basic combat loads on their person. Weapons will remain clear with magazines or clips removed until immediately prior to exiting the aircraft. **(T-3)** The troop commander will coordinate with the loadmaster prior to directing personnel to load any weapons. **(T-3)** This applies to airborne assaults and airland missions.

10.6.2. Personnel who will not immediately engage an enemy force will store basic ammunition loads in a centralized palletized location for redistribution on arrival at the objective. **(T-3)** Magazines or clips will not be inserted into weapons. **(T-3)**

10.7. Weight and Balance. Accomplish weight and balance for this aircraft according to T.O.1-1B-50, Weight and Balance, and AFMAN 11-2C-130HV3ADDA. **(T-1)** The unit possessing the aircraft maintains the primary weight and balance handbook containing the current aircraft status and provides a supplemental weight and balance handbook for each aircraft. **(T-1)** The supplemental handbook should be enclosed in a wear-resistant binder (preferably metal), stenciled "Weight and Balance" with the airplane model and complete serial number on the cover or a spine. **(T-3)**

10.7.1. The supplemental handbook will include the Chart C, which includes the aircraft's basic weight, basic moment, and center of gravity. **(T-3)**

10.7.2. The LM will file the original DD Form 365-4, Weight and Balance Clearance Form F—Transport/Tactical, at the departure airfield or electronically and maintain a physical or electronic copy for the duration of the flight. **(T-2)**

10.7.3. The weight and balance section of the unit possessing the aircraft will provide the information required to maintain current and accurate documents to the appropriate agency. **(T-2)**

10.7.4. Weight and balance may be accomplished using anyone of the following methods:

10.7.4.1. Manually using the DD Form 365-4.

10.7.4.2. Electronically using the AMC/A3V approved electronic weight and balance programs.

10.8. Emergency Airlift of Personnel. Refer to procedures in **Chapter 13.**

Chapter 11

FUEL PLANNING AND CONSERVATION

11.1. General. This chapter is designed to assist pilots, navigators, and flight planners/managers in fuel planning airland and airdrop missions, with or without low-level segments. A fuel plan is required for all flights except local area training flights.**(T-3)** The CFP and T.O. 1C-130XX-1-1 are the primary preflight references. Missions should be planned at altitudes, routes, and airspeeds to minimize fuel usage.

11.2. Fuel Conservation. It is Air Force policy to conserve aviation fuel when it does not adversely affect training, flight safety, or operational readiness. Aircrew and mission planners will manage aviation fuel as a limited commodity and precious resource. **(T-1)** Fuel optimization will be considered throughout all phases of mission planning and execution. **(T-1)** Comply with the following whenever consistent with tech order guidance and safety:

11.2.1. Fuel Loads. Excessive ramp and recovery fuel adds to aircraft GW and increases fuel consumption. Do not ferry extra fuel beyond optimum requirements for safe mission accomplishment and training objectives. **(T-3) Exception:** 618 AOC FMs should determine whether tankering is cost effective on a sortie (e.g., onload locations).

11.2.2. Flight Planning. Aircrew and mission planners will optimize flight plans and flight routing for fuel efficiency; use optimized CFPs when possible. **(T-3)**

11.2.3. APU Usage. Minimize the APU usage to the maximum extent possible. Early coordination may be required to ensure external power carts and heating/cooling units are available.

11.2.4. Center-of-Gravity. Load and maintain aircraft at an aft CG whenever possible consistent with mission requirements and Flight Manual restrictions.

11.2.5. Engine Start. Delay engine start on all departures whenever practical to minimize fuel consumption.

11.2.6. Taxi. Consider engine out taxi when permitted by Flight Manual.

11.2.7. Departure Planning. Consider use of opposite direction runway to reduce taxi and/or expedite departure routing if winds allow.

11.2.8. Takeoff. Consider a rolling takeoff as well as reduced power when able. This saves fuel and engine wear. Clean up on schedule and don’t delay gear and flap retraction.

11.2.9. Climb/Descent. In-flight procedures such as climb/descent profiles and power settings should also be considered for efficient fuel usage.

11.2.10. Weather Deviations. Attempt to coordinate for off-course deviation early so gross maneuvering is not required.

11.2.11. Cruise techniques. Attempt to trim the aircraft and match throttle settings whenever possible. Fly fuel efficient speeds and altitudes to the maximum extent possible.

11.2.12. Approach. Fly most direct routing to arrival approach consistent with mission requirements. Delay initial configuration as much as practical after considering approach complexity, weather, pilot proficiency, etc.

11.2.13. Holding. If holding is required, hold clean at the most fuel efficient altitude and request a large holding pattern. Hold at endurance or performance manual recommended holding speeds, conditions permitting.

11.2.14. Parking. Consider using shortest taxi route and avoid double blocking when able.

11.3. Fuel Planning Procedures. Aircrew should employ the following aviation fuel optimization measures without compromising flight safety or jeopardizing mission/training accomplishment.

11.3.1. Reserve and Contingency Fuels.

11.3.1.1. Plan a 45-minute fuel reserve at destination or alternate (when an alternate is required). **(T-1)**

11.3.1.2. Contingency. Fuel identified for unforeseen circumstances during any phase of flight (e.g., unforecasted weather, launch delay). For all missions, other than local training missions, calculate 15 minutes of contingency fuel using destination GWs. **(T-3)** Local training missions are not required to carry contingency fuel. If contingency fuel is carried on local training missions, it should not exceed 15 minutes. Contingency fuel is not considered reserve fuel since it can be consumed at any point during the mission. Contingency fuel will be included in the initial Required Ramp Fuel Load (RRFL) calculation. **(T-3)**

11.3.1.3. Reserve and contingency fuel will be computed using consumption rates providing maximum endurance at 10,000 feet MSL using the end of cruise gross weight (ECGW). **(T-3)** If an alternate is required, compute using weight at alternate destination. For remote destinations, compute reserve and contingency fuel using consumption rates providing maximum endurance at 20,000 feet MSL using ECGW.

11.3.1.4. ACFP will calculate reserves and contingency fuel as holding fuel. **(T-2)** CFPs will have 1+00 holding when combining 0+45 reserve and 0+15 contingency fuel. **(T-2)** For remote destinations, ACFP will plan 2+15 holding, combining 2+00 reserve and 15 minutes contingency fuel. **(T-3)**

11.3.2. Plan fuel to an alternate only when AFMAN 11-202V3 or this publication require the filing of an alternate.

11.3.2.1. When only one alternate is required, use the closest suitable airfield meeting mission requirements (such as special requirements for hazmat or patients) and AFMAN 11- 202V3 weather criteria.

11.3.2.2. If two alternates are required, use the two closest suitable airfields meeting AFMAN 11-202V3 weather criteria and fuel plan to the more distant of the two. **(T-2)**

11.3.2.3. When selecting an alternate, suitable military airfields are preferred if within 75 nautical miles of destination. (The ACFP default distance to an alternate is 75 nautical miles. Consequently, where the alternate is less than 75 nautical miles from the primary destination, ACFP will assume that the airfield is 75 nautical miles away.) **(T-2)**

11.3.2.4. The practice of selecting an alternate in another weather system or selecting an alternate based on maintenance capability will not be used. **(T-2)**

11.3.2.5. ACFP will provide a route of flight to the primary alternate if greater than 75 miles from the destination. **(T-2)**

11.3.2.6. For remote destinations, holding is authorized in lieu of an alternate airport. A remote destination is defined as any aerodrome which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2 hours flying time. In such situations, use 2+00 hrs. reserve fuel (1+15 holding in lieu of an alternate and 0+45 reserve).

11.3.2.7. When selecting an alternate located in Alaska or at latitudes greater than 59 degrees (North or South), do not add additional holding fuel.

11.3.2.8. Units may develop standard alternate fuel requirements for local training missions. However, these fuel requirements will not be less than those specified in this manual. **(T-2)** Local supplements will not dictate a standard Initial Approach Fix or "Top of Descent Fuel." **(T-2)**

11.3.3. Using all available planning tools (including ACFP) and guidance in this chapter, the PIC and navigator will determine the Required Ramp Fuel Load (RRFL).**(T-3)** When actual fuel load exceeds the RRFL by more than 2,200 lbs., defuel the aircraft to the RRFL.

11.3.4. Tankering fuel for convenience is prohibited. **(T-2)** MAJCOM C2 or 618 AOC (TACC) sanctioned tankered fuel is deemed operationally necessary, and will be included in the RRFL. **(T-2)**

11.3.5. When there is a conflict between an on-time departure and defueling, the 618 AOC (TACC) deputy director of operations (DDO) or MAJCOM C2 equivalent will determine which takes precedence. **(T-2)** The OG/CC (or designated representative) will make this determination when serving as mission execution authority. **(T-3)**

11.3.6. For those missions that are flight managed by the 618 AOC (TACC) or 613 AOC/AMD, when an AC believes the fuel load is insufficient to execute the mission:

11.3.6.1. The AC will call the appropriate FM to identify and resolve differences. **(T-3)**

11.3.6.2. If the AC and FM do not reach agreement, the AC is the final authority for adding additional fuel. The FM will add a comment to the crew papers indicating the final fuel load, "as determined by the AC." **(T-2)**

11.4. Fuel Requirements. This section augments AFMAN 11-202V3 fuel requirements. See **Table 11.1** Additional considerations:

11.4.1. Wing Relieving Fuel (WRF). WRF is additional fuel kept in the main tanks intended to counter wing bending moments. These wing bending moments are most pronounced with heavy cargo loads and lighter fuel weights. WRF is an element of primary fuel management essential for the long term structural integrity of the C-130H. WRF is considered unusable fuel until the cargo is offloaded (except in an emergency). In practical terms, it is the minimum *landing* fuel for a particular load in a specific aircraft. It is calculated using the appropriate T.O. 1C-130XX-1 Weight Limitations Chart to remain in Areas A-C from takeoff to landing. Currently, the cost of replacing wing boxes is greater than the cost of tankering additional fuel.

11.4.2. Primary/secondary fuel management.

11.4.2.1. Primary fuel management will be maintained to the maximum extent possible to reduce the effects of wing upbending and increase the center wingbox service life. **(T-2)**

11.4.2.2. All missions should takeoff in primary fuel management. Profiles that include low-level missions will initially takeoff with main tanks full anytime there is usable fuel in the external and/or auxiliary tanks. **(T-3) Exceptions:**

11.4.2.2.1. Secondary fuel management with fuel in the AUXILIARY tanks for heavy-weight max effort training.

11.4.2.2.2. Secondary fuel management with fuel in the AUXILIARY tanks for 'elevator lifts' out of an assault LZ.

11.4.2.2.3. Secondary fuel management on real-world operation.

11.4.3. Depressurization Fuel. Additional fuel required for flight at or below 10,000 feet MSL for pressure loss when carrying passengers and oxygen is not available to the passengers or sufficient oxygen is not available for the crew to fly unpressurized at 10,000 feet MSL.

11.4.3.1. With Passengers. Crews will calculate the fuel required to reach a recovery airfield in the event of depressurization at the ETP. **(T-2)** Compute at 1,000 lbs./hr. for time from ETP to a suitable airfield (ETP 'T' Time). Plan to be overhead at the recovery location with 0+30 minutes reserve fuel. Compare the calculated depressurization fuel with the Reserve (Block 2) to determine if additional fuel is required. If required add to block 6A. See **Table 11.1** and AF Form 4116, Section II, FUEL/ETP PLANNING for further details.

11.4.3.2. Without Passengers. Not required. **Exception:** If for some unforeseen reason having sufficient oxygen in accordance with **paragraph 5.15.1** and **paragraph 8.2.2.4** is not possible (e.g., more crew/MEP than regulators or enough regulators but not enough quick-don masks) then additional depressurization fuel will be necessary and will be computed using the same method as outlined in **paragraph 11.4.3.1** above. **(T-2)**

11.4.3.3. Depressurization fuel will be calculated in ACFP at 10,000 feet MSL altitude. **(T-2)** If additional fuel is required from the ETP, then ACFP automatically adds the additional fuel into block 10.

11.5. Fuel Planning. Air Force approved MPS will be the primary planning tool and T.O. 1C-130XX-1-1 will be the secondary method. **(T-3)** In addition, ACFP fuel plans provided by 618 AOC (TACC) are authorized for determining required fuel loads.

11.5.1. TO 1C-130XX-1-1 Fuel Planning.

11.5.1.1. There are three distinct phases of flight for which required fuel quantities and or fuel flows must be calculated.**(T-3)** These three phases are: initial climb out, start cruise and end cruise.

11.5.1.2. When computing fuel using T.O. 1C-130XX-1-1, use the appropriate drag index. Standardized drag indexes may be established by local OGVs and published in local supplements. Use 95 percent engine charts and Section II, FUEL/ETP PLANNING of AF Form 4116 for computations.

11.5.1.3. Use the appropriate T.O. 1C-130XX-1-1 **Part 4** figures to extract Time to Climb (TTC), Distance to Climb (DTC), and Fuel to Climb (FTC). Apply the correct temperature deviation and correct for pressure altitude to compute all climb data.

11.5.1.4. Using TTC and DTC, calculate climb TAS.

11.5.1.5. Climb Fuel. In the climb section of the enroute fuel computation worksheet enter takeoff gross weight (TOGW), total flight time, and FTC in the appropriate blocks.

11.5.1.6. Start Cruise.

11.5.1.6.1. Subtract climb fuel from the TOGW to obtain the start cruise gross weight.

11.5.1.6.2. Subtract TTC from the total time to obtain cruise time.

11.5.1.6.3. Enter the appropriate T.O. 1C-130XX-1-1 **Part 5** figure to extract fuel flow. Beginning parameters are: start cruise gross weight, pressure altitude and temperature deviation. Fuel flow extracted is per engine. Multiply the extracted fuel flow by four to arrive at fuel flow total.

11.5.1.6.4. Divide the fuel flow total by 60 and multiply by the cruise time to obtain start cruise fuel.

11.5.1.7. End Cruise.

11.5.1.7.1. Subtract start cruise fuel from the start cruise gross weight to obtain end cruise gross weight.

11.5.1.7.2. Enter the appropriate TO 1C-130XX-1-1 Part 5 figure to extract fuel flow. Entering arguments are end cruise gross weight, pressure altitude and temperature deviation. Fuel flow extracted is per engine. Multiply the extracted fuel flow by four to arrive at fuel flow total. This is also the terminal fuel flow (TFF).

11.5.1.8. Average Cruise Fuel Flow.

11.5.1.8.1. Average the start cruise and end cruise fuel flow to obtain the average cruise fuel flow.

11.5.1.8.2. Divide the fuel flow total by 60 and multiply by the cruise time to obtain cruise zone fuel total.

11.5.1.9. Total enroute fuel. Add the FTC to the cruise zone fuel total to determine total enroute fuel.

11.5.1.10. Compute preflight endurance using the Average Cruise Fuel Flow. When computing preflight endurance, always subtract 1,300 lbs. from actual ramp fuel to account for start, taxi and takeoff.

11.5.1.11. For an explanation of how to compute Maximum Endurance Fuel Flow (MEFF) using the applicable T.O. 1C-130XX-1-1, reference the MEFF planning guide at **https://cs2.eis.af.mil/sites/12679/aircrew%20pubs%20library/forms/better.aspx?RootFolder=%2Fsites%2F12679%2FAircrew%20Pubs%20Library%2FApproved%5FPublications%2FC%2D130&FolderCTID=0x01200021370D19BF5D9F459D8FD907C237955A&View=%7b701BF038-D3D9-416D-BBEC-BF178FBE44E9%7d.**

11.5.2. ACFP Fuel Planning. ACFP flight/fuel plans are available to aircrew flying 618 AOC (TACC) flight managed missions.

11.5.3. Multi-Leg Fuel Planning. See AF Form 4116 (**Figure 11.1**), Section III, Multi-Leg Fuel Planning.

11.5.3.1. A multi-leg fuel plan becomes necessary when a mission includes multiple stops where fuel is unavailable. Use the following procedure for multi-leg fuel planning, assume a three leg mission with legs labeled 1, 2, and 3:

11.5.3.1.1. Begin with the last leg (3) and fuel plan as normal to obtain required ramp fuel.

11.5.3.1.2. Next, determine the fuel required for leg 2. Include the required ramp fuel from leg 3 as identified extra fuel for leg 2. Do not plan for contingency, reserve or alternate/missed approach fuel for leg 2 unless those totals exceed the required ramp fuel for leg 3. If this occurs, add the difference in the identified extra block for leg 2. Use 1,000 lbs. for approach and landing.

11.5.3.1.3. Plan leg 1 using the same procedures used for leg 2.

11.5.3.2. Fuel requirements must be verified at each stopover airfield. **(T-3)** Requirement must be recomputed whenever the planned burnoff changes. (e.g., enroute altitude changes, actual cargo/passenger load differs from the estimate, holding is accomplished, diversion to alternate is required). **(T-3)**

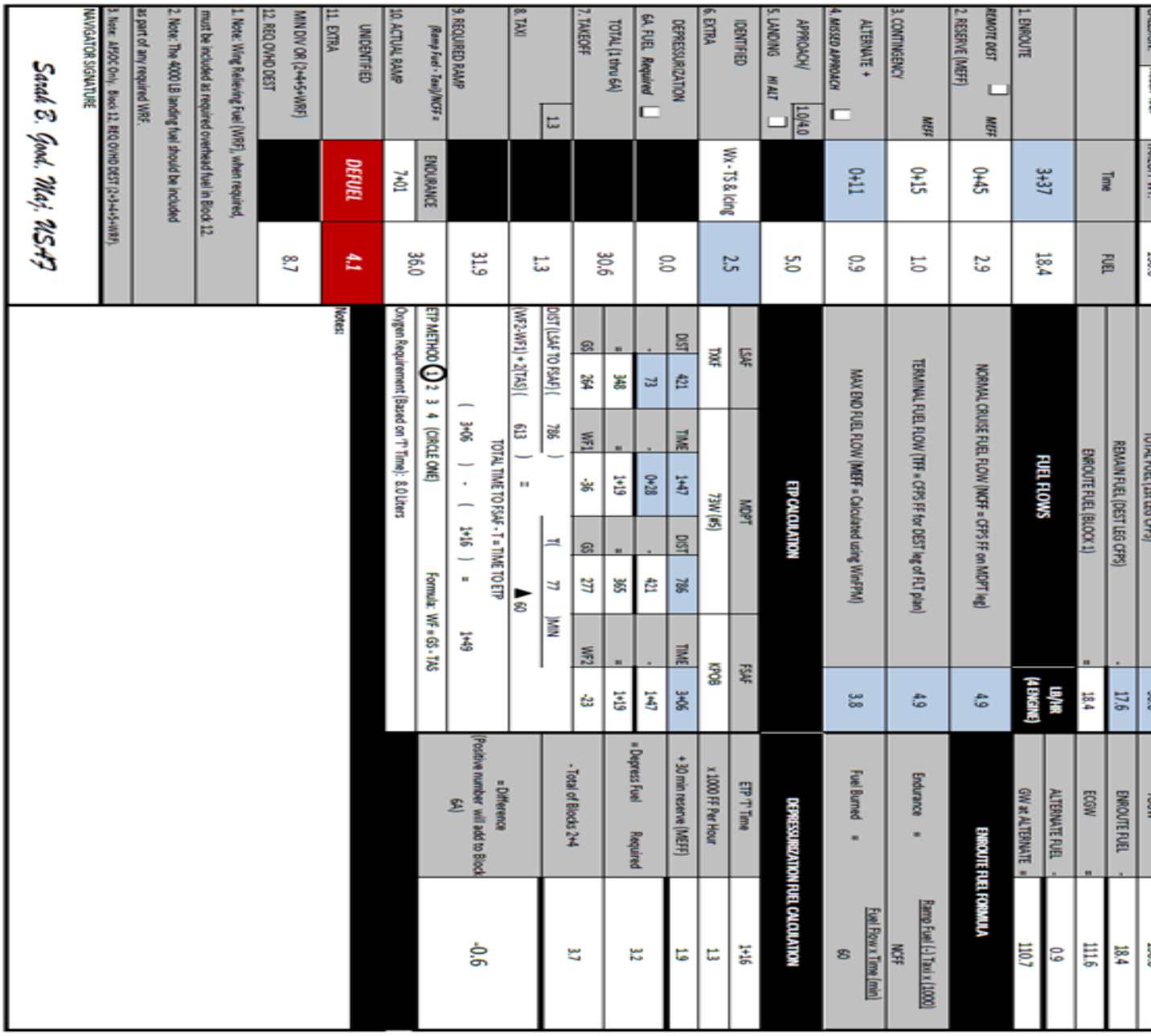
11.5.3.3. Regardless of the number of mission segments involved, fuel planning is always accomplished by planning the last legs requirements first. The remaining leg requirements are planned in the reverse order to be flown until the refueling airfield is reached.

Table 11.1. Fuel Load Components.

1. ENROUTE	Fuel for flight time from departure to overhead destination or initial penetration fix at cruise altitude (including time for planned orbit, escort, search, recovery, appropriate climb, weather recon, etc., when applicable).
2. RESERVE	45 minutes (2+00 hrs for remote destinations). Reserve fuel will be computed using consumption rates providing maximum endurance fuel flow at 10,000 MSL (20,000 MSL for remote destinations). **(T-2)** For GW, use ECGW from Section II, FUEL/ETP PLANNING of AF Form 4116. If an alternate is required, compute using weight at alternate destination.
3. CONTINGENCY	15 minutes. Use same fuel flow as reserve fuel above. (Not required for local training missions)
4. ALTERNATE AND MISSED APPROACH	**Alternate:** Fuel for flight time from overhead destination or initial penetration fix to alternate, or most distant alternate when two are required. Compute at terminal fuel flow. Required whenever alternate must be filed. **Missed Approach:** 2,200 lbs. Required if destination is below ceiling minimums but above visibility minimums for planned destination approach.

5. APPROACH/LANDING		**Approach:** 1,000 lbs. (2,000 lbs. for high altitude approach). Entry always required. **Minimum Landing Fuel:** 4,000 lbs. Entry always required. This accounts for gauge error. Do not include this 4,000lbs of fuel in the reserve and contingency fuel calculations.
6.IDENTIFIED EXTRA	STORED FUEL	Ramp fuel for succeeding legs without refueling.
	THUNDERSTORM AVOIDANCE	1,500 lbs. if forecast thunderstorms are scattered or numerous along the route of flight. Will be based on the DD Form 175-1 or equivalent. **(T-3)**
	ICING	1,000 lbs. if route of flight has forecast or known icing conditions. Will be based on the DD Form 175-1 or equivalent. **(T-3)**
	KNOWN HOLDING	Fuel for anticipated/planned excess holding time. Compute at terminal fuel flow.
	WING RELIEVING FUEL (WRF)	Dependent on cargo weight and basic aircraft operating weight. Normally negligible below cargo weights of 35,000 lbs. Calculate required WRF using the Weight Limitations Charts in appropriate TO 1C-130XX-1. Minimum landing fuel of 4,000 lbs. is included as part of the WRF total.
6A. DEPRESSURIZATION FUEL		Additional fuel for pressure loss at ETP. **With Passengers:** used when pressurized, carrying passengers, and aircraft oxygen is not available to the passengers. Compute at 1,000 lbs./hr for time from ETP to a suitable airfield (ETP 'T' time). Add 30 minutes of reserve fuel. If computed fuel required for depressurization is less than or equal block 2, no additional entry required in block 6A. If computed fuel exceeds the sum of blocks 2 and 4, add the difference in block 6A. **Without Passengers:** Not required. **Exception:** When the "oxygen requirement" is not met due to an unusual circumstance (ex. too many MEP on board) than additional depressurization fuel will be necessary and will be computed using the same method as "with passengers." **(T-2)**
7. TAXI AND TAKEOFF		1,300 lbs. Entry always required.
11. UNIDENTIFIED EXTRA		Difference between required ramp and actual ramp fuel. When actual fuel load exceeds the RRFL by more than 2,200 lbs., defuel the aircraft to the RRFL.
12. MINIMUM DIVERSION		Total of ALTERNATE/MISSED APPROACH, RESERVE, WRF and APPROACH/LANDING.

Figure 11.1. CFPS 4116 Fuel Plan.



Chapter 12

MISSION PLANNING

12.1. General. This chapter provides combat mission planning guidance for general C-130H tactical operations (airdrop planning guidance is contained in **Chapter 15**). It provides parameters used to employ the techniques and procedures of AFTTP 3-3.C-130H. Mission planning is normally conducted the day before the mission. The OG/CC or SQ/CC may elect to use a "same day mission plan" option. The PIC is ultimately responsible for the accuracy of the mission materials. Unit mission planning facilities should possess essential mission planning material.

12.1.1. In addition to this chapter, AFTTP 3-3.C-130H and AFTTP 3-3.IPE should be referenced to establish a sound understanding of the intricate combat mission planning process.

12.1.2. Mission Commander. AFMAN 11-202V3_AMCSUP specifies mission commander requirements and qualification criteria.

12.1.3. Mission Timelines. Units will supplement this manual with guidance for local and off-station timelines to include crewmember pre-mission showtimes. **(T-3)** These timelines should allow for adequate pre-mission planning, especially while conducting missions away from home station.

12.2. Mission Planning. Planners will thoroughly study enroute threats, terrain, ingress and egress routes, target areas, operations security (OPSEC) and communications security (COMSEC), political and cultural characteristics, climatology, and any other factors that enhance mission success. **(T-2)** Identify intelligence and meteorology and/or climatology requirements early because this information may not be readily available. Process mission support requests as soon as possible to allow coordination and planning. The level of coordination is dependent on available time and means of communication. Aircrews should be ready to operate in the joint arena with little or no face-to-face coordination. One full day of planning should be allocated for complex missions (e.g., Multi-ship, NVG low-level).

12.2.1. Minimum Altitude Capable (MAC). MAC is the lowest altitude an aircrew can descend to when they detect or suspect a threat. It is dependent on individual aircrew capabilities, experience level, fatigue factors, terrain clearance, etc. Since maneuvering and navigation capabilities are virtually negated at MAC, descending to this altitude is only warranted as a defensive response to an engaged threat and only for the duration of immediate threat activity.

12.2.2. NVG Mission Planning. Planning may be accomplished by the pilot, navigator, or appropriate representative designated by the mission commander for formation flights. **CAUTION:** Some red obstruction lighting systems are visible to the naked eye but not visible though NVGs. These lighting systems employ light emitting diodes (LED) instead of traditional incandescent sources. Because LEDs have a relatively narrow emission band and do not emit infrared energy like incandescent lights, it is possible for them to meet Federal Aviation Administration (FAA) requirements but be below the range in which NVGs are sensitive. LED lighting systems falling outside the combined visible and near- infrared spectrum of a NVG will not be visible through their goggles. Crews that fly using NVGs are warned to use extra caution when flying near obstacle areas and to report any hazardous sites to their appropriate safety and tactics officers.

12.2.3. Evasion Plan of Action (EPA). Aircrews and/or planners with the assistance of Intelligence and Survival Evasion Resistance Escape (SERE) specialists will develop an EPA. **(T-2)** An evasion plan may be included in the Operations Order (OPORD) or SPINS.

12.3. Planning Restrictions.

12.3.1. Landing Zones Restrictions. OG/CC is the approval authority for the use of semi-prepared LZs.

12.3.2. DZ Restrictions.

12.3.2.1. Locate multiple points of impact (MPIs) to support user ground scheme of maneuver. If MPIs are placed laterally, increase the width of the DZ accordingly. The user may request as many MPIs as required for mission accomplishment. Planners must ensure adequate deconfliction between aircraft for execution. **(T-3)** For ease of back-up timing each element may go to the same PI as desired. Coordinates must be provided for each individual PI to the aircrews (preferable in MGRS). **(T-3)** Thoroughly deconflict and brief all salvo and escape procedures as well as DZ markings prior to mission execution. Recommend marking the first PI when tactically feasible. If multiple PIs will be marked, they should be differentiated (e.g., different block letters, or RAM vs smoke).

12.3.2.1.1. During training, ensure each PI distance from the leading edge complies with DAFMAN 13-217. **(T-1)**

12.3.2.1.2. Compute minimum size DZ required for the most restrictive airdrop load being dropped on that MPI to ensure it fits within the surveyed DZ boundary.

12.3.2.2. Use of unmarked DZs (e.g., coordinate only airdrop) requires OG/CC approval for unilateral missions, and MAJCOM/A3 approval for all other peacetime training missions. Authorization to use unmarked DZs for contingency airdrops will be contained in SPINs or ATO. **(T-2) Note:** Certain combat/contingency situations may prevent marking the DZ. Aircrews may be required to airdrop on unmarked DZs; however, supported units must be made aware that drop accuracy may be reduced.**(T-3)** Planners and aircrews must thoroughly develop run-ins with good visual points for timing. **(T-3)**

12.3.2.3. Ensure coordinate format is DD MM.MM for correct input into SCNS. Using other formats will induce a navigation error with inaccurate PI coordinates. **Note:** SCNS may be used to translate UTM or MGRS coordinates into the DD MM.MM format.

12.4. Route Planning. The following factors significantly influence route development:

12.4.1. Low-level Altitude Restrictions. The following establishes minimum altitudes for C-130H airlift operations: FLIP/ICAO procedures, AFMAN 11-202V3, AFTTP 3-3.C-130H, training considerations, and terrain. Operational directives may dictate higher altitudes. **CAUTION:** Some charts may depict terrain and obstacle altitudes in meters versus feet (e.g., JOG and TLM charts in some areas of the world). **Note:** Planners should use DTED in conjunction with Vector Vertical Obstruction Database (VVOD) (set to hide towers less than 1 foot AGL) to determine MSAs and Emergency Safe Altitude (ESA). Use DTED-only (e.g., no VVOD) to determine NVG altitudes. If DTED is not available (e.g., using a printed chart or approved AF mission planning system does not have DTED), compare the highest charted spot elevation or contour interval to determine minimum altitudes in accordance with AFTTP 3-3.C-130H definitions.

12.4.1.1. Tactical Corridor. Plan low-level flights using tactical corridors. Tactical corridors should be planned as wide as possible, to provide maximum SA and flexibility. The standard width for a tactical corridor is 3 NM. Tactical corridor width can vary from 1 NM minimum either side of centerline, to as wide as desired (10 NM either side is the max recommended). Corridors do not have to be symmetrical, but must be annotated when different from the standard.**(T-3)** As a rule of thumb, tactical corridors should be wide over flat terrain and narrow in mountainous terrain.

12.4.1.2. Day VMC Enroute. Fly no lower than 500 feet AGL (or 300 AGL in accordance with **paragraph 12.4.5.8**) modified contour altitude above the terrain using visual references and radar altimeter. **(T-2)**

12.4.1.3. Night VMC Enroute (Non-NVGs). Fly no lower than an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), within the tactical corridor to include the aircraft turn radius over each turn point. **(T-2)** If the altitude for the next leg is higher than the current leg altitude, complete the climb before the next turn point. **(T-2)** If the altitude for the next leg is lower than the current leg, do not initiate descent until over the turn point. **(T-2)** Legs may be divided into segments for night altitude computations, depending on terrain differential or threats in order to allow flight closer to the ground. Once the obstacle or terrain feature is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower.

12.4.1.4. NVG Enroute. Fly no lower than indicated altitude of 500 feet above the highest spot terrain elevation within the tactical corridor. **(T-2)** Aircrews must identify factor obstacles within the tactical corridor. **(T-2)** If the aircrew does not visually identify the factor obstacles within the tactical corridor, the crew will climb to attain an altitude of 500 feet above the obstacle or avoid the obstacle laterally by 2 NM. **(T-2)** If the altitude for the next segment is higher than the current segment altitude, complete the climb prior to the segmentation point. **(T-2)** If the altitude for the next segment is lower than the current segment, do not initiate descent until over the segmentation point. **(T-2)** Once the controlling obstacle or terrain feature is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude. NVG modified contour will not be flown. **(T-2)** **WARNING:** Climb to MSA when the tactical situation allows to resolve any emergency procedures or if either the pilots' NVGs, SCNS, pressure altimeter, or radar altimeter fail. MAC training will not descend below NVG enroute altitude for the leg/segment being flown. **(T-2)** **Note:** Planning a route on a smaller scale chart, if available, significantly reduces NVG enroute altitudes. If the route has been planned on a smaller scale chart and night altitudes are verified, crews may fly the route at the lower altitudes referencing a TPC.

12.4.1.5. Minimum Safe Altitude (MSA). MSA is an initial VFR altitude that provides additional terrain clearance while the aircrew analyzes situations that require interruption of low-level operations (route disorientation and equipment malfunctions or when either pilot must leave the seat during low-level operations, etc.). Plan MSA at an indicated altitude of 500 feet above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation), within 5 NM of route centerline to include the aircraft turn radius. If the tactical corridor is > 5 NM of centerline, the MSA will be calculated for the

tactical corridor width. **(T-2)** An MSA will be computed for each leg, route segment, or entire low-level route. **(T-2)**

12.4.1.6. Minimum IFR Enroute Altitude.

12.4.1.6.1. Compute Minimum IFR Enroute Altitude by adding 1,000 feet (2,000 feet in mountainous terrain) above the highest obstruction to flight (man-made obstacle, terrain feature, or spot elevation) within 5 NMs of route centerline (10 NMs outside the US unless 5 NM authorized by MAJCOM/A3). Round this altitude up to the next 100-foot increment. If the altitude for the next leg is higher than the current leg altitude, climb will be completed before the turn point. **(T-2)** If the altitude for the next leg is lower, do not initiate descent until over the turn point.

12.4.1.6.2. Minimum altitudes for IFR operations within published military training routes (MTRs) in US sovereign airspace will be the computed leg MSA unless a higher altitude is required by DoD FLIP AP/1B, *Area Planning North and South America*. **(T-2)**

12.4.1.7. Emergency Safe Altitude. ESA is designed to provide positive IMC terrain clearance during emergency situations that require leaving the low-level structure. Several ESAs may be computed for route segments transiting significant terrain differentials or a single ESA may be computed for the entire low-level route. To compute ESA, add 1,000 feet (2,000 feet in mountainous terrain) to the elevation of the highest obstruction to flight within 22 NMs of planned route centerline. Compute an ESA for the route and conspicuously annotate on the chart. **Note:** Climbing to ESA may put the aircraft or formation in a controlled (e.g., IFR) altitude structure requiring coordination with ATC agencies. **Note:** Pressure altimeters are calibrated to indicate true altitudes under International Standard Atmospheric conditions. Any deviation from these standard conditions result in erroneous readings on the altimeter. This error becomes important when considering obstacle clearances in temperatures lower than standard since the aircraft's altitude is below the figure indicated by the altimeter. Refer to the Flight Information Handbook (FIH) to determine correction.

12.4.1.8. When routes are flown at temperatures of 0° Celsius or less, apply cold weather temperature corrections to Night VMC Enroute, NVG Enroute, Minimum Safe, and Emergency Safe altitudes in accordance with FIH Section D procedures.

12.4.2. Airdrops will not be conducted below the following altitudes:

12.4.2.1. **WARNING:** DZ surveys cannot assure terrain and obstruction clearance. Planners and aircrews are responsible for ensuring clearance through mission planning/chart preparation. **Note:** In combat or contingency operations, the supported unit commander may direct drops below the AFMAN 11- 231, *Computed Air Release Point Procedures*, altitudes.

12.4.2.2. Day VMC Drop Altitude. Fly minimum day VMC airdrop altitudes as specified in AFMAN 11-231, visually avoiding high terrain and obstacles in the vicinity of the DZ. **(T-2)**

12.4.2.3. Night VMC Drop Altitude. If not on NVGs, fly minimum night VMC run-in altitudes through slowdown, at an indicated altitude of 500-feet above the highest

obstruction to flight (man-made obstacle, terrain feature, or spot elevation), within 3 NM of run-in centerline. **(T-2)** If on NVGs, fly NVG enroute altitudes through slowdown. In both instances (with/without NVGs), after slowdown, when the DZ is in sight and will remain in sight, or when a positive position is identified and adequate terrain clearance is assured, the aircraft may descend from run-in altitude to drop altitude.

12.4.2.4. IMC Drop Altitude. Fly minimum IMC drop altitudes at 500 feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), whichever is highest, within 3 nautical miles either side of the run-in centerline from DZ entry point to DZ exit point or as specified in AFMAN 11-231, whichever is higher. Formation descent will not begin until the last aircraft is at or past the DZ entry point. **(T-2)** Compute in accordance with AFTTP 3-3.C-130H.

12.4.3. Night VMC Tactical Approach Altitude. Compute in accordance with AFTTP 3-3.C-130H.

12.4.4. IMC Letdown Corridor. Develop in accordance with AFTTP 3-3.C-130H for an arrival and departure from an LZ.

12.4.5. Peacetime Route Restrictions. In addition to restrictions in AFMAN 11-202V3, specific country or theater of operations publications, and FLIP area planning, routes will not be flown:

12.4.5.1. With less than 1 NM separation (3 NMs when in excess of 250 KIAS) when below 2,000 feet AGL from known sensitive environmental areas such as hospitals, fish hatcheries, ostrich and emu farms, large poultry complexes, recreation areas, institutions, and similar locations. **(T-2)**

12.4.5.2. With less than 3 NMs separation from prohibited airspace. **(T-2)**

12.4.5.3. With less than 3 NMs separation from nuclear power plants. **(T-2)**

12.4.5.4. Through restricted airspace, except transition or termination in such areas where the planning unit is a primary using agency or has approval of the controlling agency. **(T-2)**

12.4.5.5. In weather conditions less than those specified in this manual and AFMAN 11-202V3. **(T-2)**

12.4.5.6. Below 1,000 feet AGL within a 2,000 feet radius over cities or towns shown as magenta shaded areas on 1:500,000 (TPC) scale charts; or yellow shaded areas on FAA sectional charts. **(T-2)**

12.4.5.7. Over or through active live fire or impact areas that may not be specifically designated as prohibited or restricted areas. **(T-2)**

12.4.5.8. Below 500 feet AGL unless:

12.4.5.8.1. Host nation rules specifically allow such VFR operations. **(T-2)**

12.4.5.8.2. A host nation agreement approves deviation (e.g., multi-lateral exercises). **(T-2)**

12.4.5.8.3. Routes or training areas have been environmentally assessed and surveyed for 300-foot AGL operations. **(T-2)** **Note:** This restriction does not apply to one-time-

use routes or nations without an environmental assessment requirement. Consult DoD FLIP AP/1B for published military training route restrictions.

12.4.5.9. For the airdrop portion of all Station Keeping Equipment (SKE) missions filed under IFR, or for portions of IFR SKE routes flown in uncontrolled airspace, the mission command unit must comply with appropriate FAA exemptions. (**T-0**). Provide a NOTAM to the FAA flight service station nearest the affected areas so that it is in-place at least 6 hours in advance of the intended activity, regardless of actual or forecast weather. **(T-2)** Required NOTAM information includes:

12.4.5.9.1. Name of the nearest city or town and state.

12.4.5.9.2. Date and time period of intended activity.

12.4.5.9.3. Number and type of aircraft.

12.4.5.9.4. Altitudes.

12.4.5.9.5. IFR drop corridor ingress and egress points of the route segment expressed in radial and DME from a VORTAC or LAT/LONG.

12.4.6. Navigation Chart Preparation. Mission planners will construct a master chart for mission briefings and aircrew reference. **(T-3)** Planners should construct the chart using computerized mission planning systems if available. Low-level navigation charts will be annotated with any added, deleted, or changed information in the most recent VVOD or supplement. **(T-2)** In no case will VVOD coverage be less than 22 NMs either side of the entire planned route of flight. **(T-2)** Crews may trim charts to no less than 10 NMs after establishing the ESA. Color copies, if available, of a master chart reduce the probability of missing or misplotted data on aircrew charts.

12.4.6.1. Chart Annotation. Annotate the master chart with the applicable **Chapter 8** and AFTTP 3-3.C-130H requirements. Refer to AFTTP 3-3.C-130H and AFPAM 11-216 for detailed chart annotation symbology. Annotate an individual's chart with the minimum: turn points, initial point, DZ, course line, course data, VVOD and date, ESA and chart series/date.

12.4.6.2. The pilots and navigator will use individual tactical navigation charts for each mission. **(T-3)** Charts may be printed or electronic and not scaled at less than 100%. Electronic charts must comply with all chart preparation requirements. **(T-2)** Electronic charts may be JPEG, PDF, or other readable format, and may be loaded onto an EFB for reference during flight. In all cases, maintain at least one available paper chart during the mission. **(T-3)**

12.4.7. Mission Forms and Logs.

12.4.7.1. AF Form 4053, *INS Flight Plan and Log*. An AF Form 4053 should be used when planning tactical low-level missions. A MAJCOM approved computer generated flight plan may be used in lieu of the AF Form 4053.

12.4.7.2. AF Form 4051, *Low-level Flight Plan and Log*. Pilots will complete and use either an AF Form 4051 or AF Form 70 for all low-level airdrop/airland missions. **(T-3)** A log or stick diagram containing the same information or an aircrew flimsy page containing this information may be substituted for the AF Form 4051/AF Form 70.

12.4.7.3. AF Form 4062, *C-130 Run-in/Drop Information Card*. Navigators/engineers will use the AF Form 4062 to annotate pertinent information during all tactical airdrop missions. **(T-3)**

12.4.8. Route Study. Route study is mandatory before accomplishing flight in the low-level environment .**(T-3)** Special emphasis should be placed on the run-in and objective area for the locations of visual and radar features that will assist in proper identification.

12.4.9. Drop Zone Safety Boxes. Aircrew will identify and brief DZ safety boxes for all airdrops to include both SCNS tolerances and visual references (if available) for the lateral and longitudinal boundaries. **(T-3)** Safety box construction will be validated by a pilot or another navigator. **(T-3)** Aircrew should brief SKE contracts for SKE formation airdrops.

12.5. Briefings.

12.5.1. Mission Briefings. The AC is responsible for ensuring all crewmembers are briefed on applicable mission items. **(T-3)** The standard mission briefings can be found in AFTTP 3-3.C-130H, Combat Mission Guide (CMG). **Note:** At a minimum, all crewmembers should be aware of the mission objective, route overview, threat analysis, airdrop information, and receive all relevant mission products to improve SA.

12.5.2. Mission Debriefings. Should be held immediately after the mission. The standard mission debriefing can be found in AFTTP 3-3.C-130H CMG.

12.5.2.1. Aircrews attend the operations and maintenance debriefings as directed by unit or mission commander. Maintenance debrief should be conducted as soon as possible after flight.

12.5.2.2. Intelligence debriefings will be accomplished as soon as practical after mission recovery. **(T-3)**

Chapter 13

AIRLAND EMPLOYMENT

13.1. General. Detailed airland employment guidance can be found in AFTTP 3-3.C-130H Chapter 6, *Airland Operations.*

13.2. Passengers on Tactical Flights.

13.2.1. MAJCOMs will establish guidance for when passengers are allowed on tactical flights. **(T-2)**

13.2.2. When flying AMC missions AMCI 11-208 governs this requirement.

13.3. Airfield Requirements. Aircrews should reference DAFMAN 13-217 for all airfield requirements.

13.4. Engine Running Onload and Offload (ERO) Procedures.

13.4.1. Use ERO procedures when necessary to expedite aircraft or cargo movement, meet time requirements of unit moves, joint training exercises, and contingencies or enhance crew duty day. The PIC is responsible for prior coordination with 618 AOC (TACC) or the controlling agency for approval for ERO, operations as well as early takeoffs. **(T-3)** With the exception of small arms ammunition (Hazardous Class/Division 1.4), do not use ERO procedures when explosive cargo is involved unless authorized in the JA/ATT, exercise operation or contingency ATO. **(T-1)** ERO procedures may be used for any mix of personnel or cargo. Material handling equipment should be used if palletized cargo is to be onloaded or offloaded. PICs must assess prevailing weather, lighting and parking location to ensure safe operations. **(T-3)** At their discretion, PICs may ERO any category of passenger. The number of passengers and amount of baggage to be onloaded or offloaded should be taken into consideration. **WARNING:** Do not onload or offload through the crew entrance door and cargo ramp and door at the same time. Paratroop doors are normally not used.

13.4.2. General Procedures.

13.4.2.1. PICs will brief crewmembers on the intended ERO operation. **(T-3)**

13.4.2.2. The parking brake will be set and at least one pilot in the seat will monitor brakes, interphone, and radio. **(T-3)**

13.4.2.3. Use wing leading edge and taxi lights to enhance safety at night as the situation dictates.

13.4.2.4. Station another crewmember on interphone or public address (PA) in the cargo compartment as safety observer. Safety observers will remain forward of all cargo. **(T-3)**

13.4.3. Offload Preparation/Procedures Trough the Cargo Ramp and Door. Prior to landing, the LM will brief all personnel in the cargo compartment regarding their locations, duties, and responsibilities during the ERO. **(T-3)**

13.4.3.1. Brief drivers offloading vehicles on the following items:

13.4.3.1.1. Exact offload procedures and applicable signals to be followed.

13.4.3.1.2. When cleared by the LM, to assume their position. Actuate brake pedal sufficiently to ensure brakes are operational. Vehicles requiring a build-up of air pressure to provide brake pressure must delay pressure build-up until engine start. **(T-3)**

13.4.3.1.3. The LM will direct vehicle engines to be started when the aircraft comes to a complete stop and the cargo ramp and door are open. **(T-3)** Vehicle parking brakes will not be released until all restraint is removed and cleared by the LM. **(T-3)**

13.4.3.1.4. Vehicles will proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping. **(T-3)**

13.4.3.2. Brief personnel on the following items:

13.4.3.2.1. Secure baggage aboard vehicles, if applicable.

13.4.3.2.2. When directed by the LM, deplane and proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping. **(T-3)**

13.4.3.3. After the aircraft is slowed to taxi speed, the loadmaster may remove all tiedowns except one forward and one aft restraint, open the aft cargo door, and position the ramp no lower than horizontal. After the aircraft is stopped and upon clearance from the pilot, the loadmaster lowers the ramp, and clears off headset (if necessary) to direct on or offload operations. **Exception:** For AE missions, the LM will be positioned in a location to observe safety and on headset during actual onload procedures. **(T-3)** ***WARNING***: If a combat offload of pallets is to be accomplished before offloading vehicles, do not remove any vehicle restraint until after the combat offload is complete. **(T-3)** **Note*:*** Loadmasters will ensure vehicles and troops proceed directly aft of the aircraft at least 50 feet before turning and/or 300 feet before stopping. **(T-3)**

13.4.3.4. The LM will direct all onload and offload operations using pre- briefed signals. **(T-3)** Other qualified LMs (Contingency Response Group (CRG), aerial port) may perform these duties; however, the aircraft LM retains overall responsibility for the operation.

13.4.3.5. Personnel on/offload through the aft cargo door and ramp.

13.4.3.5.1. Passengers will be escorted by a crewmember or qualified CRG, aerial port, or airfield control personnel (e.g., Special Tactics Team, (STT)) when enplaning or deplaning through the aft door and ramp. **(T-3)**

13.4.3.5.2. Auxiliary ground loading ramps should be used.

13.4.3.5.3. Unless cargo size and location dictate otherwise, deplane passengers before cargo, and enplane after cargo.

13.4.3.6. Personnel onload and offload through the crew entrance door:

13.4.3.6.1. Station a crewmember (normally the LM) on interphone/wireless headset with cord held taut at approximately 20-feet at an angle of 45-degrees from the aircraft axis. **(T-3)**

13.4.3.6.2. Brief deplaning personnel to secure loose articles and remain forward of the interphone cord. **(T-3)**

13.4.3.6.3. No enplaning personnel will approach the airplane until the LM is in place. **(T-3)**

13.4.4. Upload Preparation/Procedures. Review the passenger and cargo manifests, crew lists, and complete DD Form 365-4 for the subsequent sortie.

13.4.4.1. LMs may use the load plan total weight and load center of balance (CB) for entry on the DD Form 365-4 provided these procedures are followed:

13.4.4.2. The load plan data must be checked and validated by a current/qualified load plan validator e.g., aircraft LM, aerial port specialist, or any individual who has completed the AMC Affiliation Program Airlift Planners Course. **(T-3)**

13.4.4.3. The load plan validator will legibly sign the signature block on the load plan with name, rank, and organization. **(T-3)**

13.4.4.4. The load must be placed on the aircraft exactly according to the load plan. **(T-3)**

13.4.4.5. Prior to flight, if there is any doubt on the accuracy of the load plan weight or CB, the LM must accomplish the DD Form 365-4 by station loading each individual item. **(T-3)**

13.4.4.6. If downloading to an empty aircraft, a DD Form 365-4 is not required for the subsequent sortie.

13.4.4.7. After completion of onload or offload, secure the ground loading ramp(s) in the installed position (if mission dictates), in the cargo compartment, or stow them in the aft cargo door.

13.4.4.8. Raise ramp to approximately 12-inches above the horizontal position prior to taxi.

13.4.4.9. AE Engines Running Onloads. For AE missions requiring EROs, see AFMAN 11-202V3_AMCSUP.

13.5. Combat Offload Procedures.

13.5.1. The controlling C2 commander, MAJCOM/A3, or DIRMOBFOR may authorize combat offload when conditions warrant. The method of combat offload will be determined by the aircrew based on the conditions at the offload site. Unit OG/CC (delegated no lower than the Squadron operations officer) may approve unilateral combat offload training.

13.5.2. Cargo pallets, airdrop platforms, and CDS containers can be offloaded without damage to the aircraft with the cargo ramp in the horizontal position. Use the following methods for combat offload operations.

13.5.3. Combat Offload Method "A."

13.5.3.1. A taxiway or ramp at least 500 feet long is required, however, 1,000 feet is desired to provide a margin of safety. When pallets, platforms, or containers are offloaded one at a time, use a longer taxiway based on the number to be offloaded. WARNING: Many explosive items have specific "drop" criteria that, if exceeded, render the item useless or dangerous to the user. Explosives and munitions shall not be combat offloaded. **(T-2) Exception**: Small arms ammunition (hazard class and division 1.4) and explosives/munitions rigged for airdrop may be combat offloaded**.** ***CAUTION:*** When

using method “A” on excessively rough, sharply undulating, or battle-damaged surfaces, damage to the aircraft ramp may occur. Reducing forward taxi speed on these surfaces will reduce aircraft oscillation. The AC must determine if the offload area will permit the offload operation to be conducted without damage to the aircraft or equipment. **(T-3)**

13.5.3.2. Combat offload of fragile and sensitive cargo items (e.g. computers) that might be damaged by standard method “A” combat offload procedures will not be attempted without user concurrence. **(T-3)** If the nature of the mission dictates that cargo must be offloaded, aircrews may lower the ramp to approximately 18 inches above the ground.

13.5.3.3. Single, multiple singles, double/triple married pallets, and airdropped rigged platforms up to 24 feet may be offloaded, without ballast, using this method provided their total weight does not exceed 12,000 lbs., and the height of the pallets/platforms fall within cargo height jettison limit in section III of the flight manual or the cargo loading manual.

13.5.3.4. Single, multiple singles, married pallets and airdrop rigged platforms over 12,000 lbs. may be offloaded using this method, provided ballast or cargo equal to the difference between 12,000 lbs. and the combined weight of the pallets or platforms (to be offloaded) remains in C through F compartments during offload. **Example:** A 17,000 lb. married pallet or airdrop platform requires 5,000 lbs. of ballast or cargo to remain in C through F compartments during the offload.

13.5.3.5. CDS bundles may be combat offloaded using this method. The static line retriever will be used via manual activation or using the WGRS; manual gate cut may be done if the retriever is INOP. **(T-3)**. With the centerline vertical restraint (CVR), offload must be accomplished one side at a time if the total bundle weight exceeds 12,000 lbs. **(T-3)** Non-CVR single stick may be offloaded if the total weight is less than 12,000 lbs. Without the CVR, if the total weight of the bundles exceeds 12,000 lbs., bundles should be restrained in groups of four or less and offloaded one group at a time. For the unplanned combat offload of non-CVR bundles, restrain the bundles as described above. Perform an initial offload via the static line retriever, and on sequential offload remove aft restraint before clearing the pilot to taxi. Consider the slope of the offload site, which may cause bundles to roll aft upon removal of restraint.

13.5.4. Method “B.” Use this method to offload married pallets that do not fit the category for method "A" or for which no ballast is available for married pallets weighing between 12,000 to 15,000 lbs. Use four serviceable steel 55-gallon drums under each pallet to be offloaded. The correct number of steel drums needed to complete this type of offload must be available at the offload site or must accompany the load when conditions at the offload site are unknown. **(T-3) WARNING:** The maximum weight for pallets to be offloaded across the ramp at any one time when using method “B” is 15,000 lbs. for C-130H aircraft. Do not use method "B" for airdrop-rigged platforms to prevent binding the platform under the vertical restraint rails. **(T-3)**

13.5.5. Aircrew Procedures:

13.5.5.1. Prior to commencing combat offload operations, the pilot will brief each crewmember on the method to be used. **(T-3)** Specific procedures are in the expanded checklist. The pilot will coordinate tasks. **(T-3)**

13.5.5.2. All crewmembers participating in the offload will refer to the checklist. **(T-3)** Report any problem to the pilot immediately.

13.5.5.3. If other individuals must be aboard to assist the crew in an unusual circumstance, give them a thorough safety and procedures briefing for the entire offload sequence. **(T-3)**

13.5.5.4. A safety observer will take position at the bottom of the flight deck steps on interphone and PA and transmit warnings through all speakers of the PA system to help the LM enforce all safety precautions. **(T-3)**

13.5.5.5. The LM will maintain constant interphone contact with the PIC and is the only crewmember authorized to operate the dual rail locks during combat offload operations. **(T-3) WARNING:** During the entire offload operation, no one is permitted behind or beside the load unless the LM checks that all rail locks are locked and engaged in the pallet detents or secures each pallet to aircraft tiedown rings to ensure positive aft restraint. Always maintain forward restraint with the right-hand locks.

13.6. Emergency Airlift of Personnel. Apply the following procedures to ensure a safe, efficient loading method for the emergency airlift of personnel and aeromedical evacuation of litter patients from areas faced with enemy siege, hostile fire, for humanitarian evacuations, or when directed by the MAJCOM C2. See AFMAN 11-2AEV3ADDENDA-A for litter patient floor loading procedures. See AFTTP 3-3.C-130H for floor loading techniques.

13.6.1. Emergency airlift normally is accomplished without the use of individual seats or safety belts. The number of personnel that fit on the cargo floor will depend on individual size. Seat personnel in rows facing forward and load in small groups of 5 per row so they may be positioned and restrained by connecting the pre-positioned tiedown straps from the left and right outboard pallet rings. Load personal effects/baggage in any safe available pallet position.

13.6.1.1. When available, mattresses or other cushioning material may be used for seating.

13.6.1.2. When available, a pallet subfloor may be installed. The maximum number seated on a pallet subfloor will vary with passenger size, however, plan on up to 100 passengers on the cargo floor and 20 passengers on the ramp.

13.6.1.3. When a pallet subfloor is installed, or when the intermediate rollers are removed from the aircraft, use the rail rings for attaching the tiedown strap used for forward restraint and body stability.

13.6.1.4. When a pallet subfloor is not used, consider removing the intermediate rollers from the aircraft, mission conditions permitting.

13.6.1.5. When the intermediate rollers are not removed from the aircraft, secure them on the outboard rails.

13.6.1.6. Seat troops, passengers, and ambulatory patients facing forward.

13.6.1.7. Attach a tiedown strap for each row of personnel to provide forward restraint and body stability.

13.6.1.8. When the intermediate rails are stacked on top of the outboard rails, use floor rings for attaching the straps. In this situation, the available seating space is decreased, and the number of passengers must be decreased.

13.6.1.9. Secure baggage on the cargo ramp/floor. Excess baggage and cargo secured on the cargo ramp/floor will decrease the number of troops, passengers, and patients proportionately.

13.6.1.10. The maximum altitude for emergency airlift will not exceed FL 250. **(T-2)**

13.6.2. AFMAN11-202V3_AMCSUP dictates flight altitude limitations based on oxygen availability for passengers.

13.7. NVG Operations.

13.7.1. ALZ lighting patterns will be in accordance with DAFMAN 13-217. **(T-2)**

13.7.2. NVG Approaches and Landings. The navigator will program a backup ARA approach in SCNS and configure the radar to monitor the approach course to assist the pilot in LZ acquisition, approach, and landing. **(T-3)**

13.7.3. NVG Formation Departures/Arrivals. The mission commander will thoroughly brief NVG formation departures/arrivals to include emergency procedures, abort calls, light discipline, runway markings, etc. **(T-3)**

13.7.4. Crew Coordination. Coordinated actions during the final segment of an NVG approach and landing are critical.

13.7.4.1. Navigator Duties. In addition to backing up the pilots with the radar, the navigator should call when descending through 100', 50', 40', 30', 20', and 10' (or as requested by the pilot). On departure, the navigator should call out passing 100', 200', 300' and 400' AGL. The navigator will ensure terrain clearance with the radar. **(T-3)**

13.7.4.2. PM Duties. Beginning at 300 feet AGL, the PM should verbalize airspeed and rate of descent ("107, down 6" indicates 107 KIAS and a minus 600 VVI/VSI). The PM should also call out when passing 60 KIAS on landing roll.

13.7.4.3. Engineer Duties. The engineer's primary job is to monitor engine instruments and ensure checklist completion. The pilot will brief the engineer of any additional crew coordination requirements. **(T-3)**

13.8. Tactical IFR/VFR Approaches.

13.8.1. Tactical VFR Approaches. Bank angle will not exceed 45 degrees at night or when any flaps are extended. **(T-2)** The aircraft will not descend below 150 feet AGL until rolled out on final. **(T-2)** The first pilot to acquire the LZ should state "Pilot/Copilot has the LZ." The next pilot to acquire the zone should announce "Pilot/Copilot has the LZ at (state clock position)."

13.8.2. Tactical IMC Approaches. IMC approaches may be flown by either pilot. The PF may execute the instrument approach with NVGs down but shall not use NVGs during the instrument portion (PF will have to look under the NVGs for instrument crosscheck).**(T-3)** The transfer of aircraft control for the landing will be no lower than 300 feet AGL. **(T-2)** Altitude advisories shall be in accordance with earlier chapters of this manual. **(T-2)** The first pilot to acquire the LZ should state "Pilot/Copilot has the LZ." The next pilot to acquire the zone should announce "Pilot/Copilot has the LZ at (state clock position)."

Chapter 14

AIRCRAFT FORMATION

14.1. General. Formation procedures will be conducted in accordance with this chapter and the applicable flight manual. **(T-2)** Additional standardized techniques and procedures to fly formation are outlined in AFTTP 3-3.C-130H.

14.2. Weather Minimums. Formation takeoff and landing minimums are the minimums for the airport navigation aid used, but not lower than 200 feet and one-mile visibility (RVR 5000). During IFR formation operations, adhere to both ceiling and visibility minimums. (T-1) If departure ceiling or visibility is below published landing minimums, but above 200 feet and one-mile visibility (RVR 5000), the formation may takeoff if the requirements for a departure alternate as prescribed in AFMAN 11-202V3_AMCSUP are met. If the runway has dual RVR readouts (approach and departure end of the runway), both ends must be at least RVR 5000. (T-2)

14.3. Ground Operations. Minimum taxi interval is one aircraft length with four engines operating and two aircraft lengths with two engines operating.(T-3) Formation lead may increase taxi intervals if circumstances dictate.

14.4. Takeoff.

14.4.1. The minimum takeoff interval between aircraft is 15-seconds. **(T-3)**

14.4.2. For aborts during takeoff, the navigator immediately transmits an abort call (three times using formation position number) on interplane and the copilot on primary frequency. Clear the runway as quickly as safety allows. Succeeding aircraft not on takeoff roll will hold until the runway is clear.**(T-3) Note:** For aircraft without hot mic capability on primary radio, the navigator transmits the abort call on primary, and the copilot (or navigator if the copilot is occupied with emergency procedures) transmits on interplane. **Note:** Consider not using HAVE QUICK or secure radio for interplane during takeoff unless the formation is monitoring another common frequency (e.g. ATC).

14.4.3. Do not advance power above flight idle until takeoff roll is started.

14.5. Altimeter Setting. Formation leaders will ensure all aircraft use the same altimeter setting. **(T-2)**

14.6. Formations.

14.6.1. At no time will aircraft be operated within 500 feet of another aircraft. **(T-2)**

14.6.2. Airspeed Changes. Lead will announce unplanned airspeed changes of 15-knots or greater at night. **(T-2)**

14.6.3. Inadvertent weather penetration procedures will be briefed to the formation. **(T-3)** At a minimum, formation lead will direct the formation to a safe altitude, heading, airspeed, and aircraft spacing. **(T-2)**. Refer to AFTTP 3-3.C-130H for inadvertent weather penetration procedures. **Note:** Do not attempt MCAD/RVAD/SKE airdrops in areas of thunderstorm activity, heavy precipitation, or during icing conditions.

14.7. Visual Geometries.

14.7.1. Visual formation contracts will be briefed. **(T-3)**

14.7.2. Night Geometries.

14.7.2.1. Avoid flying line abreast for extended periods of time.

14.7.2.2. Unaided night visual formations must have SKE or data link operational or the formation is restricted to in-trail or wedge (no fluid trail) with spacing no closer than 2,000. **(T-3)**

14.7.3. Night Threat Reactions for Training. NVGs are required for night threat reactions. The aircraft must remain within the NVG enroute altitude corridor or climb to MSA. **(T-3)**. **Note:** Any crewmember will call "Terminate" if they observe the aircraft being flown outside the above parameters. **(T-2)**

14.8. Visual Rejoins.

14.8.1. Rejoining aircraft will maintain 500 feet above or below the formation until the formation is in sight and clearance to rejoin is granted. **(T-3)**

14.8.2. Rejoining aircraft must be in position at formation altitude by "green light" to accomplish the drop. **(T-3)**

14.9. Tactical Formation Maneuver Restrictions.

14.9.1. The MC will brief altitude and airspeed terminate criteria. **(T-3)**

14.9.2. Day VMC: No restrictions.

14.9.3. Night VMC:

14.9.3.1. NVGs will be used. **(T-3)**

14.9.3.2. Formation contracts and non-standard verbal signals will be briefed. **(T-3)**

14.9.3.3. SKE or data link should be operational.

14.9.3.4. Shackles, cross turns, and half cross turns should be limited to times when necessary for formation maneuvering. Verbal signals must be used. **(T-3)** Normally, shackle, cross turn, and half cross turn training should be conducted during day VMC. **WARNING:** When flying at night, rapid changes in airspeed, altitude, bank angles, "G" loads and aircraft position necessitated by the performance of these maneuvers increase the potential for spatial disorientation.

14.9.3.5. The MC will brief lighting procedures (if the wingman calls "blind", etc.). **(T-3)**

14.10. Visual Slowdown Procedures. Unless tactically unsound, night slowdowns will include an aural or visual signal. (T-3)

14.11. Visual Airdrop Procedures. Minimum spacing for CDS airdrops is 6,000 feet between aircraft.(T-3) WARNING: Attempting to regain position by only reducing power or airspeed places the aircraft in a nose high, low-power situation and may lead to a stall.

14.12. Visual Recovery. For all visual recoveries, roll out on final at no less than 150 feet AGL. Aircraft will not descend below preceding aircraft during the recovery. **(T-3)**

14.13. Landing.

14.13.1. The desired interval is 20 seconds, minimum 15 seconds. Begin timing when preceding aircraft crosses the runway threshold.

14.13.2. Do not perform touch-and-go landings during formation recoveries. **(T-3)**

14.14. SKE Procedures.

14.14.1. Use the pressure altimeter and VVI/VSI to monitor altitude during climb or descent. The formation lead announces the altitude passing each 2,000 feet (including departure and recovery) (N/A when all aircraft are utilizing data link). All aircraft report reaching assigned altitude in sequence to the formation leader. Formation lead will not report the formation level to ATC until all aircraft have reported level at the assigned altitude. **(T-2)**

14.14.2. Priority of Flight Command Indicator (FCI) signals are altitude, heading then airspeed.

14.14.3. Unless otherwise briefed, spacing between aircraft will be 4,000 feet and spacing between element leads will be 8,000 feet. **(T-3)** Minimum SKE spacing is 4,000 feet between aircraft.

14.14.4. Lead will signal turns of 10 degrees or more and airspeed changes of 10 KIAS or more. **(T-3)**

14.14.5. Flight Lead/Element leads will fly 20 degrees of bank for planned enroute turns. **(T-3)** For formation check turns all aircraft (including element leads) will use 30 degrees of bank prior to SD and 10 degrees of bank after SD, unless otherwise briefed. **(T-3)**.

14.15. Loss of SKE-Individual Aircraft. Notify lead in all cases.

14.15.1. VMC: If only the plan position indicator (PPI) is INOP aircraft may elect to maintain position with lead's concurrence. The route, drop, and recovery may be flown. **Note:** Consider using air-to-air TACAN, data link, or radar to maintain spacing.

14.15.2. IMC.

14.15.2.1. Loss of all SKE indications (to include PPI) will require a breakout of the affected aircraft. **(T-3)** Use the following procedure if an alternate plan was not briefed:

14.15.2.2. If the formation is in straight and level flight the affected aircraft will climb 500 feet and turn 30 degrees in the safest direction from the base heading for 30 seconds, and then return to base heading. **(T-3)** If the formation is in a turn, roll out and climb 500 feet. If the formation is in a climb or descent, level off (terrain permitting) and notify lead. Lead will contact (or direct contact to) ATC for a separate clearance. **(T-1) CAUTION:** Performing the above maneuvers in a radar pattern may place an aircraft outside of protected airspace.

14.16. SKE Rejoins.

14.16.1. Set leader number as required to the formation according to lead's direction and enable all formation slot numbers.

14.16.2. Set "range" X 1,000 feet, switch at maximum range.

14.16.3. Approach the formation from 1,000 feet above or below the formation.

14.16.4. Establish radio contact with the formation. Confirm SKE frequency and appropriate leader's slot number.

14.16.5. When the formation appears on the PPI, check that the master lost indications have been extinguished.

14.16.6. The rejoining aircraft will identify the appropriate element leader. **(T-3)** Upon positive identification, the appropriate lead will complete an FCI check prior to the rejoin. **(T-3)**

14.16.7. Join in position while maintaining 1,000 feet altitude separation. When stabilized in position and the last formation aircraft is positively identified, request rejoin clearance from formation lead and climb or descend to formation altitude.

14.16.8. The rejoining aircraft must be stabilized in position at formation altitude by the IP for IMC or by one-minute prior to the Time Over Target (TOT) for VMC to accomplish the drop. **(T-3)**

14.17. SKE Airdrop Procedures.

14.17.1. Slowdown. The entire formation will slowdown simultaneously. **(T-3)** Lead signals 30 seconds prior to slowdown with the SKE "SD" prep. Lead transmits a 5-second "-" prep. Lead initiates slowdown with the FCI "E" and a radio call (tactical situation permitting). After slowdown, flight lead/element leads will not exceed 10 degrees of bank. **(T-3)**

14.17.2. Descent to IFR Drop Altitude. Do not initiate descent until the following conditions are met:

14.17.2.1. Lead position is positively identified.

14.17.2.2. The entire formation is within 3 NMs of DZ run-in course centerline.

14.17.2.3. The last aircraft in the formation is at or past the DZ entry point (or the last aircraft in the flight or element if using the waterfall descent procedures).

14.17.3. Run-In.

14.17.3.1. For RVAD airdrops, crews should verify at least two different offset aim points (OAPs) during the run-in and, at a minimum, will have one OAP active from the 1- minute advisory through the escape point. **(T-3)**

14.17.3.2. Element leaders and wingmen maintain formation position in relation to their lead Track While Scan (TWS) until they are established on drop altitude and airspeed. When these two requirements are met, element leaders and wingmen conducting RVAD are cleared their own independent run-in to their own Computed Air Release Point (CARP).

14.17.3.3. Each element stacks 50-feet above the preceding element's drop altitude. For large formations, e.g., greater than two flights, all aircraft within a flight will maintain the same drop altitude with following flights stacking 50-feet above the preceding flight's drop altitude. **(T-3) WARNING:** Analyze pre-drop GW to determine if obstructions can be cleared with one engine INOP. If obstruction clearance cannot be met, reduce aircraft GW, revise run-in and/or escape course, or increase drop altitude.

14.17.4. Airdrop.

14.17.4.1. All aircraft will use formation lead's passed drift to determine SKE crosstrack. **(T-3)**

14.17.4.2. Formation lead will pass back a ballistic wind to the entire formation. **(T-3)** Normally, all aircraft will use this wind for identical SCNS programming; however, differing airdrop loads and rapidly changing winds in extended formations may require aircraft to use different ballistic winds. **(T-3)** Brief expected deviations to using formation lead's ballistic wind in the formation/mission brief.

14.17.4.3. After level at drop altitude, formation lead will pass back revised drift and ballistic winds if different than pre-planned or previously relayed. **(T-3)**

14.17.5. No-Drop Procedures.

14.17.5.1. SKE flight and element leaders will continue to pass SKE preps provided the no-drop situation does not affect the wingmen or formation. **(T-3)** In the absence of SKE preps, crews utilizing RVAD are authorized to drop.

14.17.5.2. In IMC, a formation "no-drop" will be signaled via FCI and over interplane, if tactically sound. **(T-3)**

14.18. SKE Formation Landing. The interval between aircraft for landing is 6,000 feet desired, 5,000 feet minimum. (T-3)

14.19. C-130H and C-130J Integration/Interfly Procedures. Reference AFTTP 3-3.C-130H for C-130H and C-130J interfly procedures.

Chapter 15

AIRDROP

15.1. General. This chapter provides guidance for C-130H airdrop operations. It provides parameters used to employ the techniques and procedures of AFTTP 3-3.C-130H.

15.1.1. Equipment and CDS airdrops performed above 3,000 AGL will be made using one of the following methods: RVAD, Ground Radar Aerial Delivery System (GRADS), Joint Precision Airdrop System (JPADS), Improved Container Delivery System (ICDS), or a Radar Beacon Airdrop.**(T-3)** A SKE wingman may execute a SKE timing drop provided the leader navigates to the release point by RVAD, GRADS, or a radar beacon.

15.1.2. Airdrops overwater can be planned up to 5,000 feet AGL using standard methods.

15.2. Identification of Airdrop Items.

15.2.1. Identify supplies or equipment by the following class numbering system:

15.2.1.1. Class I – Subsistence.

15.2.1.2. Class II – Individual equipment.

15.2.1.3. Class III – Petroleum/Oils/Lubricants (POL).

15.2.1.4. Class IV – Construction materials.

15.2.1.5. Class V – Ammunition (include the type):

15.2.1.5.1. Type “A” – Small arms.

15.2.1.5.2. Type “B” – Mortars.

15.2.1.5.3. Type “C” – Artillery.

15.2.1.6. Class VI – Personal demand items.

15.2.1.7. Class VII – Major end items (vehicles, howitzers, etc.).

15.2.1.8. Class VIII – Medical supplies.

15.2.1.9. Class IX – Repair parts.

15.2.1.10. Class X – Non-military programs (e.g., agricultural supplies).

15.2.2. Airdrop loads may also be identified by the following internationally recognized color coding system for combined operations:

15.2.2.1. Red – Ammunition and weapons.

15.2.2.2. Blue – Fuel and lubricants.

15.2.2.3. Green – Rations and water.

15.2.2.4. Yellow – Communications equipment.

15.2.2.5. White – (or Red Cross on white background) – Medical supplies.

15.2.2.6. Black and white stripes – Mail.

15.3. Airdrop Kits. The LM will carry enough equipment in the airdrop kit to satisfy load or mission requirements. **(T-3)** Minimum contents of airdrop kits will include cloth-backed pressure sensitive tape, masking tape, 1/2-inch tubular nylon cord, 550 cord, 5 cord, 80 lb. cotton webbing, one carabineer (NSN 4240-01-0295-4305 or equivalent carabineer with locking mechanism), and two small G-14 clevises. **(T-3)** For Low Cost Low Altitude Airdrop (LCLA) airdrops, three locking carabineers rated at 23 kilo newtons (kN) each, are required. **(T-3)**

15.4. Airdrop Load Information.

15.4.1. The LM will complete the applicable DD Form 1748, *Joint Airdrop Inspection Records,* before takeoff (see Air Force Joint Instruction (AFJI) 13-210/AR59-4/OPNAVINST 4630.24D/MCO 13480.1D, *Joint Airdrop Inspection Records, Malfunction/Incident Investigations, and Activity Reporting* for specifics) and verify the accuracy of cargo and troop documentation. **(T-1)** The Joint Airdrop Inspectors (JAIs) will check all inspection items for all loads to be dropped during that mission. **(T-1)** For loads that require in-flight rigging, the JAIs will annotate on the DD Form 1748 which items are required to be completed during flight, and the aircrew LMs will ensure those items are completed and checked. **(T-1)** No further inspections by the JAIs are required. **Note:** Reject loads with inaccurate or unavailable weights, or loads hazardous to flight. Equipment not rigged per 13C-series technical orders (TO) or Joint Special Operations Command (JSOC) 350 series manuals, requires a waiver from the appropriate MAJCOM Tactics agency/division.

15.4.2. If airdrop loads and airland loads are carried at the same time, see the restrictions listed in **Table 15.1** These restrictions are designed to prevent airland loads from interfering with airdrop rigged equipment.

Table 15.1. Load Planning Restrictions.

	RESTRICTIONS	MINIMUM DISTANCE (INCHES)
1.	ANCHOR CABLE HEIGHT FROM AIRCRAFT FLOOR	80 inches
2.	RETRIEVER WINCH CABLE/PULLEY FROM AIRCRAFT FLOOR	84 inches
3.	DISTANCE BETWEEN ANCHOR CABLES: (a) CDS OR EQUIPMENT (b) PERSONNEL (**Note 1**) (1) FORWARD BULKHEAD (2) CENTER ANCHOR CABLE SUPPORTS	108 inches 6 inches INBOARD, 64 inches OUTBOARD 76 inches INBOARD, 76 inches OUTBOARD
4.	AIRLAND CARGO HEIGHT	CANNOT INTERFERE WITH OVERHEAD RIGGING EQUIPMENT

		CDS ONLY – 80 inches HEIGHT (**Note 2**)
5.	CARGO LOCATIONS ON PERSONNEL AIRDROPS (STATIC LINE OR High Altitude Low Opening (HALO))	TROOP DOOR EXIT: NO CARGO BETWEEN FS 657-737 RAMP EXIT: FORWARD OF FS 700
6.	PERSONNEL DISTANCE FROM AIRDROP RIGGING EQUIPMENT	60 inches
7.	SAFETY AISLE TO REAR OF AIRCRAFT (**Note 3**)	ALL MISSIONS, ALONGSIDE OR OVERTOP OF CARGO
8.	ACCESS TO DUAL RAIL CONTROL HANDLES	SIDEWALL SEAT 1L AND 2L NOT USED
9.	ACCESS TO OPERATE CDS EQUIPMENT	SIDEWALL SEAT 1L AND 2L NOT USED

Notes:

1. Personnel airdrops may be performed with only one troop door configured for airdrop with user concurrence.
2. Will not exceed 80 inches with 12 inches either side of retriever cable. Height of cargo outside of the 12 inches left and right (total 24 inches) may exceed the 80 inches height limitation, but will not interfere with overhead rigging equipment.
3. CDS and heavy equipment configuration. A maximum of three rows of canvas seats may be used. The remaining vacant row serves as a safety aisle. All sidewall seats will be raised or stowed in the wheel-well area when airland pallets and vehicles are located within this area and exceed 96 inches width. **(T-3)**

15.5. Verification of Load Information. The navigator will verify the actual number and type of parachutes, load weights, sequence of extraction, and position or loads in the aircraft agree with planned CARP data. (T-3) If an individual load has a different type or number of parachutes from other loads, compute a CARP for each load to ensure all loads land on the DZ. Base drop altitude on the item requiring the highest drop altitude.

15.6. Marking Airdrop Loads. For training missions (e.g., unilateral, exercise, or JA/ATT) the navigator will mark all CDS bundles, HE platforms, extraction lines and standard airdrop training bundles with the aircraft call sign and date. (T-3) Additionally, if more than one load is dropped on the same pass, mark loads with order of exit from aircraft. Exception: If more than one CDS bundle is dropped on the same pass, mark only the first container out.

15.7. DZ Markings. Plan, coordinate, and brief DZ markings according to DAFMAN 13-217.

15.8. Safety Equipment.

15.8.1. Personnel required to be mobile in the cargo compartment will wear protective headgear from the combat entry point to the combat exit point if an actual threat is briefed. **(T-3) Exception:** Personnel performing water jumps. All other personnel will be seated with the seat belts fastened. **(T-3)** Check helmet boom mike during preflight. LMs will lower their helmet visor (except when NVGs are used) before opening any doors and keep them lowered until doors are closed. **(T-3)** As a minimum, the helmet will be worn from the start of the pre-slowdown checklist until the completion of the drop checklist. **(T-3)** LMs will be on interphone from completion of the pre-slowdown checks until completion of the drop checklist. **(T-3)**

15.8.2. During airdrops, LMs will wear a restraint harness from the pre-slowdown checklist until doors are closed and locked. **(T-3)** When using a restraint harness, LMs performing duties near an open ramp and/or door in-flight will attach the lifeline in accordance with **paragraph 15.8.3**. **(T-3)** If carried, LMs may wear a parachute instead of a restraint harness. Parachute will be worn from the pre-slowdown checklist until doors are closed and locked. **(T-3)** **WARNING:** During the aircrew briefing, the PIC will brief the LM(s) when the mission profile requires flight below 800 feet AGL with door(s) open. **(T-3)** **Note:** LMs must wear a restraint harness when performing duties near an open exit above 25,000 feet MSL or below 800 feet AGL. **(T-3)** **Exception:** Flight examiner loadmasters are exempt from wearing a parachute or restraint harness while conducting flight evaluations provided they do not go aft of FS 737.

15.8.3. When used, fit the restraint harness and adjust the lifeline before flight as follows:

15.8.3.1. Troop door personnel drops. Connect the hook to tiedown ring 26D and adjust the lifeline to allow mobility only to the troop door for installation of the paratroop retrieval strap/bar and to accomplish other emergency procedures. When dropping with CVR sections 2 and 3 installed, connect the hook to the CVR tiedown ring near the floor tiedown ring 25D.

15.8.3.2. Troop door SATB drops. Connect the lifeline as described in **paragraph 15.8.3.1** or to a floor/dual rail tiedown ring at FS 657 and adjust to allow mobility only to the troop door being used.

15.8.3.3. Ramp and door operations (PERS/HE/CDS/CRRC/LCLA/SATB/ICDS/JPADS). LMs will pre-measure the harness with the ramp and door in the ADS position prior to flight.**(T-3)** Connect the hook to a floor/dual rail tiedown ring at FS 737, adjusting to a point that will preclude the wearer from exiting the aircraft. Restraint harness lifelines may be attached to an unused anchor cable provided the anchor cable stop is positioned and taped at FS 737. **WARNING:** Except for an actual contingency, towed trooper, or emergency that threatens the survivability of the aircraft and crew, the restraint harness will not be disconnected or lengthened to a point that would allow the LM to fall outside the aircraft. **(T-2)** **WARNING:** Anchor cables will be inspected in accordance with T.O. 1C-130A-9, *Cargo Loading Manual*. **(T-2)**

15.8.4. LMs will wear a LPU for operations over bodies of water when doors are open and a parachute is worn or with restraint harness below 2,000 feet AGL. **(T-3)**

15.8.5. During an airdrop, occupants in the cargo compartment will either have a seat belt fastened, wear a restraint harness, or wear a parachute (if carried) before doors are opened. **(T-3)** For static line jumps, static lines are attached to anchor cables before doors are opened. **Exception:** Jumpers exiting on subsequent passes (racetracks) may stand and hook up with doors open if they are forward of the aft edge of the wheel wells (FS 617). **Note:** Do not use flight deck restraint harness.

15.8.6. User safety personnel will provide their own parachutes for contingency missions. **(T-3)**

15.9. Secure Enroute Communications Package (SECOMP). Use of SECOMP will cease at the discretion of the PIC if it interferes with either aircraft equipment or an aircraft emergency condition. **(T-3)**

15.10. Airdrop Weather Minimums and Wind Restrictions. Comply with AFMAN 11-202V3 and FLIP VFR weather minimums for visual airdrops. **(T-1)** For OCONUS VFR airdrops, comply with host nation VFR criteria if more restrictive than AFMAN 11-202V3. Comply with DAFMAN 13-217 for minimum DZ weather/wind restrictions. **(T-1)** If there are any contradictions between AFMAN 11-231 and DAFMAN 13-217, the DAFMAN 13-217 wind limit tables will take precedence. **(T-1)**

15.11. Airdrop Checklist. Aircrew members will use the airdrop checklist found in the applicable flight manual. **(T-3)**

15.11.1. During the PIC's crew briefing, the pilot, navigator, and LM will coordinate appropriate times or geographical location for execution of all checklists. **(T-3)** The time required by the LM will determine when checklists must be accomplished enroute. Complete all items of the preceding checklist before beginning the next checklist. The Combat Entry checklist will be accomplished prior to entering the tactical or threat environment or when deemed necessary by the PIC. **(T-3)** **Exception:** The "SLOWDOWN CHECKLIST" may still be in progress after the "ONE MINUTE ADVISORY." **Note:** Avoid using the word "green" or "light" from the slowdown checklist until arriving at the release point.

15.11.2. The "twenty minute", "ten minute", "one minute", and "five second" advisories are required for all personnel airdrops. Only the "one minute" and "five second" advisories are required for equipment and CDS airdrops. Additional advisories may be provided at crew discretion if requested by the user and pre-coordinated with the aircrew. **Note:** LM will ensure jumpmasters receive all time advisories, wind updates, and no-drop decision when passed. **(T-3)**

15.11.3. The navigator will give accurate time advisories regardless of checklist in progress. **(T-3)** Advisories are based on planned TOT up to slowdown. After slowdown, all advisories are based on green light time from the DZ. **Note:** During personnel airdrops, the aircraft must be at or above drop altitude and stable not later than one minute out (two minutes out for jumpmaster directed (JMD) drops) to allow the jumpmaster access to the paratroop door. **(T-3)** The LM will notify the PIC when an emergency condition exists in the cargo compartment, complete the required emergency checklist and report completion of the malfunction checklist or status. **(T-3)** Normal airdrop checklists are resumed if possible. If not possible, proceed with the completion of drop checklist.

15.12. Airdrop Altitudes and Airspeeds. See AFMAN 11-231 for specific airdrop altitudes and airspeeds. The aircraft must be level at drop altitude and on drop airspeed by green light time. **(T-3)** Slowdown during personnel drops should be planned to allow jumpmaster access to paratroop doors not later than (NLT) 1-minute before TOT (2-minutes for JMD drops). **Exception:** Aircraft should be stable (on altitude, airspeed, deck angle) 15 seconds prior to "green light" for sight angle airdrops.

15.13. No Drop Decisions. Should the crew believe the drop will occur outside of safe parameters, they will call "no-drop" and ensure the red light is illuminated. **(T-3)** The PM and LM will acknowledge the no-drop call. **(T-3)**

15.14. Drop Zone Communications. See DAFMAN 13-217 and AFTTP 3-3.C-130H for DZ communication procedures.

15.15. Methods of Aerial Delivery. The following are approved methods of aerial delivery:

15.15.1. Mission Computer Airdrop (MCAD) when verified using RVAD or visual update procedures. **Note:** If single-ship IMC and unable to verify the mission computer via RVAD, do not descend or drop, even if the GPS has a FOM of 3 or better (N/A for ICDS and JPADS).

15.15.2. Visual Airdrop.

15.15.3. Ground Marked Release System (GMRS). **Note:** The user assumes responsibility for airdrop accuracy during GMRS drops.

15.15.4. Verbally Initiated Release System (VIRS). **Note:** The ground party accepts responsibility for airdrop accuracy.

15.15.5. Jumpmaster Directed Personnel Release Procedures. See AFTTP 3-3.C-130H for expanded procedures.

15.15.5.1. JMD drops are limited to single ship operations only. These drops may be performed by qualified AF or sister service jumpmasters (or trainees under the supervision of qualified personnel). Units will receive approval notice through the mission tasking directive or from the appropriate theater C2 agency, annotated on JA/ATT Form 612R, tasking order, etc.

15.15.5.2. The following conditions apply:

15.15.5.2.1. The jumpmaster's parent service/user accepts all responsibility for the accuracy of the drop, plus any potential injuries/damage to equipment.

15.15.5.2.2. Specific in-flight visual signals, verbal signals, and interphone procedures between the jumpmaster, LM, and PIC will be coordinated during the pilot, LM, and jumpmaster briefing. **(T-3)**

15.15.5.2.3. Navigators will still accomplish Computer Air Release Point (CARP) or High Altitude Release Point (HARP) calculations to back up the computations and in-flight directions given by the jumpmaster. **(T-3)** A navigator's CARP/HARP is not required when using streamers/spotter chutes.

15.15.5.2.4. JMD releases will not be mixed with any other type of airdrop method, e.g., GMRS, VIRS, or standard CARP drops. **(T-3)** If JMD drop procedures are called for, the crew will follow the jumpmaster's instructions, while adhering to normal safety

concerns. **(T-3)** Should the crew believe the drop will occur outside of safe parameters, they will call "no-drop" and ensure the red light is illuminated. **(T-3)**

15.15.6. Radar Beacon Airdrops. Radar beacon drops in IMC during peacetime must be approved by MAJCOM/A3 for Regular Air Force units and either Air Force Reserve Command (AFRC)/A3 or NGB/A3 for AFRC/ANG units. **(T-2)** The AOC/AMD may approve IMC radar beacon airdrops for exercises or for contingency and combat operations.

15.15.7. Low Cost Aerial Delivery System, Low Velocity (LCADS-LV) Airdrops.

15.15.7.1. LCADS-LV is authorized for use with the JPADS mission planner using G-12 ballistics until LCADS-LV is incorporated into the mission planner. When dropping LCADS-LV without using the JPADS mission planner, use ballistics from the most current Air Transportability Test Loading Agency (ATTLA) memorandum for "Computed Air Release Point (CARP) data for LCADS Low Velocity (LOW-V) Parachute." **(T-2)**

15.15.7.2. LCADS-LV airdrops will use break-away static lines regardless of altitude. **(T-2)** The static line break tie will be full strength Type III nylon (550) cord for all LCADS-LV parachutes. **(T-2)** Use of gutted Type III cord will result in chute deployment failure. JAI must be vigilant to ensure proper static line configuration, including anti-oscillation ties. **(T-2)**

15.15.8. ICDS/JPADS Airdrops.

15.15.8.1. ICDS and JPADS airdrop operations are conducted using the JPADS Mission Support Equipment System (MSE), UHF Dropsonde Receiver Subsystem (UHF-DRS), GPS Retransmit System (GPS-RTS), and Joint Precision Aerial Delivery System Mission Planner (JPADS-MP) laptop software. ICDS operations are conventional ballistic CDS airdrops with non-steerable chutes using the JPADS MSE, PADS-MP, and dropsondes to calculate an improved CARP. JPADS operations are conducted using steerable chutes with Autonomous Guidance Units (AGUs). Aircrew will use the appropriate JPADS checklists located on the AMC/A3V publications webpage. **(T-3)**

15.15.8.2. JPADS certified aircrews are authorized to airdrop above 3,000 feet AGL without the use of radar beacon, GRADS, or RVAD when using JPADS procedures and equipment.

15.15.8.3. JPADS certified POs are authorized to use the JPADS mission planner and software to calculate release points for JPADS/ICDS airdrop operations. The PO will determine a revised CARP using dropsonde data (if required), and will advise the crew of the updated release point. **(T-3)** After the JPADS-MP produces the updated CARP, it is entered into the Mission Computer. The PM and PO will verify the CARP and all airdrop parameters are entered correctly into the navigation system. **(T-3)** For verification, the PO will read the JPADS-MP computed release point coordinates directly from the JPADS-MP while the pilot not flying verifies the same information is in the aircraft navigation system**. (T-3)**

15.15.8.4. The PO or mission planner is required to provide JPADS-MP derived CARP(s) for each airdrop pass and a completed ADE prior to airdrop mission execution. **(T-3)** Both pilots will review preflight CARP(s) and ADE for each respective airdrop. **(T-3)** During the cargo door dropsonde release, use of zero flaps at speeds between 170-180 KIAS is

required to preclude dropsonde tail strikes. LMs will open the cargo door for the dropsonde airdrops. **(T-3)** LMs will release the dropsonde from the corner of the cargo ramp, which will be in the fully closed position. **(T-3)** Upon hearing and seeing "GREEN LIGHT", release the dropsonde at a 45-degree angle away from the corner of the ramp.

15.15.8.5. Airdrop Damage Estimate (ADE): Units must perform a full airdrop damage assessment prior to ICDS/JPADS airdrops. **(T-3)** The ADE must be coordinated and approved by the area controlling agency. **(T-3)** Coordinate with the owning agency of the restricted airspace or controlled airspace and landowners with property surrounding the DZ for all ICDS/JPADS operations. Examine the area in the vicinity of the DZ for potential damage or hazards in the course of normal operations or during extraordinary system failure events. If the ADE demonstrates potential damage or hazards restrict the airdrop release Launch Acceptability Region (LAR); lower the drop altitude, change the run-in, change parachute type, or cancel airdrop operations. Inform the controlling unit of the risk to their operations; the controlling unit, and the Joint Force Commander (JFC) designated agency are approving authorities for risk to the area surrounding the DZ. Intelligence personnel are responsible for providing the JFC-designated agency close-up and overview imagery to facilitate ADE. For actual JPADS training airdrops, units will contact AMC Combat Tactics (AMC/A3DT) (2-3 weeks prior) in order to ensure all planning, coordination, and reviews/assessments have been accomplished. **(T-3)** Operations conducted at Yuma Proving Ground under JPADS related test plans do not need AMC Weapons and Tactics & Electronic Warfare (AMC/A3TW) review. See DAFMAN 13-217 for further information. The ADE must include, at a minimum, a review of airspace and ground space with respect to: CARP and LAR location, ICDS success ellipse, chute failure footprint and guidance failure footprint. **(T-3)**

15.15.8.6. IMC/VMC day/night drops are authorized for contingency operations. CONUS training operations are required to comply with Federal Aviation Regulation (FAR) 105 restrictions. **(T-0).** Drops conducted through or originating from IMC are only authorized from within or above an active restricted area or military operations in uncontrolled airspace. Before conducting IMC drops, check with controlling agency for additional local restrictions. JPADS parachutes will not be dropped through severe turbulence or severe icing. **(T-2)**

15.15.8.7. When dropping JPADS, dropsondes are not required. When dropping near the edge of the Launch Acceptability Region (LAR) or in strong/variable wind conditions, dropping a dropsonde is recommended to improve the drop solution and reduce risk.

15.15.8.8. For Dropsonde release, JPADS airdrop, and I-CDS airdrop, a GPS Figure of Merit (FOM) 3 or better is required from the "ONE MINUTE ADVISORY" until "GREEN LIGHT." **(T-3) EXCEPTION:** Crews may conduct I-CDS airdrop if aircraft position is verified by a validated active offset aim point using RVAD procedures in lieu of meeting the GPS FOM requirement.

15.15.8.9. Wind Limits. Wind limitations are unrestricted for dropsonde operations, 17 knots and greater for JPADS Ultra Light Weight (ULW)/2K-M/10K, and as published in DAFMAN 13-217 for all other parachutes.

15.15.8.10. Altitude and Weight Limits.

15.15.8.10.1. JPADS 2K/2K-M operations conducted from 5,000 feet AGL to 24,500 feet MSL have a weight range of 850 to 2,280 lbs. rigged weight. Training payloads may be dropped as low as 3,500 feet AGL. When dropping 3,500 to 5,000 feet AGL, payload weights will be within 1,380 to 1,780 lbs. rigged weight. **(T-2)**

15.15.8.10.2. JPADS 10K operations conducted from 5,000 feet AGL to 24,500 feet MSL have a weight range of 5,000 to 10,000 lbs. rigged weight. Training payloads may be dropped as low as 3,500 feet AGL.

15.15.8.11. DZ Size. DZ size criteria for JPADS and ICDS drops during contingency operations is at the discretion of the user. During training, DAFMAN 13-217 DZ size restrictions apply.

15.15.8.12. JPADS Guidance Footprint Locations. During normal training operations a JPADS DZ, CARP, chute failure footprint, and guidance failure footprint will be located within a restricted airspace and on military owned property. **(T-2)** If winds force the CARP outside of the restricted airspace additional coordination with ATC is required prior to airdrop operations. **(T-3)** This includes coordination with ATC agency, filing a Notices to Airmen (NOTAM), and ensuring airspace is clear for the entire guided system's flight profile from drop altitude to the ground.

15.15.8.13. During normal training operations the ICDS success footprint will be located within the surveyed DZ boundaries. **(T-2)** The chute failure footprint must fall within restricted airspace. **(T-2)** If outside of a restricted airspace, the chute failure must fall on the surveyed DZ. **(T-2)** If operating in a restricted area and winds force the CARP outside of restricted airspace coordination with ATC is required prior to airdrop operations. This includes coordination with the ATC agency, filing a NOTAM and ensuring airspace is clear from the drop altitude to the ground. **(T-2)**

15.15.8.14. JPADS Military Grade Global Positioning System (MILGPS) Procedures. Follow MILGPS keying procedures contained in guidance documents. The JPADS contains a Selective Availability Anti-Spoofing Module (SAASM) Global Positioning System (GPS) within the guidance unit (referred to as "JPADS MILGPS"). The JPADS MILGPS is located within the Avionics Module for the ULW/2K-M. The JPADS 10K MILGPS is located in a separate enclosure compartment. The JPADS MILGPS is approved to receive crypto-variable GPS keys and is an UNCLASSIFIED but controlled item and must be handled to preclude unauthorized access, tampering, theft, or loss. Due to the general application and associated security protocols, black GPS keys will be used. **(T-2). Note:** Keying and unkeying requires the MILGPS to be installed in a powered ON AGU. The AGU LCD screen should update within 20 seconds and should read MILGPS Keyed or Unkeyed. Once complete power OFF the AGU. The PO will remove and return the enclosure to the unit's tactics office. **(T-3)**

15.15.8.14.1. When programing JPADS guidance units, the following items are the most critical and must be verified after the final data transfer, or at any point prior to the airdrop: **(T-3)**

15.15.8.14.1.1. The intended impact point coordinates in latitude/longitude or MGRS ("LAT/LON" or "MGRS").

15.15.8.14.1.2. The elevation of the intended impact point ("IP Elev"). Ensure use

of the correct PI from the current Drop Zone survey is crucial to system navigation.

15.15.8.14.1.3. The JPADS parachute type used ("Canopy").

15.15.8.14.1.4. Total rigged weight of the airdrop load ("Weight"). **Note:** The transfer of the mission file from the JPADS Mission Planner is not necessary if all programmed information within the guidance unit has been reviewed and validated as correct.

15.15.8.14.2. Jettison of JPADS 2K-M AGU with Military GPS (MILGPS). Instances of jettison of the JPADS 2K-M with MILGPS must be reported to the GPS controlling authority. **(T-2)** Each such report shall include the Avionics Module serial number and must state whether the system was keyed or unkeyed. **(T-2) Note:** Time permitting, the LM with concurrence from the PIC/PO will remove the Avionics Module from the JPADS 2K-M prior to load jettison. **(T-3)**

15.15.8.15. Intermediate gates made of ½-inch tubular nylon or greater will be rigged on all JPADS-equipped CDS bundles. **(T-3)** Intermediate gates are used to ensure 3-second separation between bundles. Intermediate gates will not be considered restraint when computing aft restraint requirements. **(T-3)** All additional aft restraint requirements will be met utilizing normal aircraft restraint provisions. Cut the release gate(s)/intermediate release gate(s) in accordance with **paragraph 15.28.3** or **paragraph 15.28.3.1**. **(T-3)**

15.15.8.16. For single stick JPADS drops, all intermediate gates will be manually cut by the LM. **(T-3)** Double stick JPADS drops are authorized with the Wireless Gates Release System (WGRS).

15.16. High Altitude Airdrop Oxygen Requirements.

15.16.1. A continuous supply of 100% oxygen will be used during unpressurized operations in accordance with **Table 15.2**. **(T-2)**

15.16.2. Loadmasters should utilize the High Pressure Oxygen System (HPOS) on all airdrops above 10,000 feet MSL where extended mobility in an unpressurized aircraft is required beyond any standard oxygen hose provided. When properly preflighted, the HPOS may be used during any aircraft emergency requiring the use of supplemental oxygen. The HPOS will not be used as a source of oxygen for pre-breathing requirements but may be transitioned to, once pre-breathing requirements have been satisfied. **(T-2)**

15.16.3. When dropping from 20,000 feet MSL or higher, use pre-breathing procedures. When the aircraft oxygen system does not provide sufficient oxygen regulators for all personnel, approved portable oxygen console(s) will be preflighted and installed in the aircraft. **(T-2)** The console(s) will provide enough oxygen regulators for all parachutists and crewmembers not accommodated by the normal aircraft systems.

15.16.4. When mission essential, aircrew trained in accordance with AFI 11-403, *Aerospace Physiological Training Program*, may operate aircraft unpressurized up to Flight Level (FL) 250 in accordance with MAJCOM guidance and AFMAN 11-202V3.

15.16.5. Pre-breathing requirements for missions at or above FL 200. All personnel will prebreathe 100% oxygen below 16,000 feet MSL pressure altitude or cabin altitude on any mission scheduled for an exposure at or above FL 200 for times shown in **Table 15.2**. **(T-2)** Operational considerations dictate that pre-breathing must be completed before the cabin

altitude exceeds 16,000 feet MSL. **(T-2)** The AC, with recommendations from the PT, will determine the course of action for a break in pre-breathing.**(T-3)** All personnel on board the aircraft will remain on 100% oxygen until cabin altitude is below FL 200. **(T-2)** After descent below FL 200, all personnel will remain on 100% oxygen or select supplemental oxygen until 10,000 feet MSL. **(T-2)** Pre-breathing will be conducted with personally-fitted oxygen mask attached to an approved helmet and personal oxygen system. **(T-2)** **Note:** Portable oxygen bottles may not be used for pre-breathing; the quick-don/smoke mask is emergency equipment and is not approved for pre-breathing or operations conducted at or above FL 200. The purpose of pre-breathing (denitrogenation) is to reduce the amount of nitrogen in the body and therefore reduce the risk of altitude-induced decompression sickness (DCS). Pre-breathing times are based on scientific research that outlines acceptable DCS risks. Major factors that enhance the effectiveness of denitrogenation are good hydration and good circulation.

Table 15.2. Oxygen/Prebreathing Requirements and Exposure Limits for High Altitude Operations.

Altitude	Oxygen Requirement	Pre-breathe Time[2]	Maximum Exposure Time Per Sortie[1]
10,000 to 12,999 feet MSL	Aircrew: 100% O2 Jumpers: See AFMAN 11-409	N/A	Aircrew: Unlimited Jumpers: See AFMAN 11-409
13,000 feet MSL to FL 199	100% O2	N/A	Unlimited
FL 200 to FL 249	100% O2	30 Min	110 Min
FL 250 to FL 299	100% O2	30 Min	60 Min
FL 300 to FL 349	100% O2	45 Min	30 Min

Notes:

1. Maximum exposure time per sortie is when cabin altitude reaches maximum planned altitude; extended or delayed ascent times expose everyone onboard to greater DCS risk; missions that require staggered altitude drops will use accumulative times per sortie information for mission planning. **(T-2)** Mission planned drops at FL 350, FL 299, and FL 249; 30 minutes upon reaching FL 350, descent to FL 299, spend only 30 minutes (60 accumulative), descent to FL 249, spend only 50 minutes (110 minutes accumulative). Limits based on not exceeding 23% DCS under laboratory conditions (<1% operational impact such as abort or mission alteration/descent).
2. No more than 3 Pre-breather sorties in a 24-hour period unless otherwise restricted.

15.16.6. The jumpmaster may dictate the use of supplemental oxygen by any or all jumpers at altitudes less than those listed. Parachutists transfer from aircraft oxygen system or portable oxygen console to personal oxygen system at approximately one minute before green light.

15.16.7. Pressurization Scheduling. Maintain cabin pressure at or below 10,000 feet MSL until the Cabin Altitude Check and the Pre-Slowdown checklist (time for check may have to

be adjusted) are complete. Depressurization will not exceed 3,000 Feet Per Minute (FPM).**(T-3)** Slower rates are recommended if time allows. Ensure zero pressure differential before opening doors.

15.17. High Altitude Operational Requirements for Physiology Technicians (PT). PTs will support high altitude airdrop missions in accordance with AFMAN 11-409, *High Altitude Airdrop Mission Support Program.* **(T-1)** One USAF PT is required for each 16 personnel on board the aircraft for all unpressurized high altitude missions conducted at or above 20,000 feet MSL. **(T-2)** PT support for high altitude missions below FL 200 is by request to further mitigate risks and is highly recommended. **(T-3)**

15.18. High Altitude Airdrop PT Duties.

15.18.1. PTs will fly as crewmembers as stated on aeronautical orders. **(T-3)** When missions require a PT, the PT will be on interphone at all times. **(T-3)** PT flight duty stations will be as required to monitor crewmembers, jumpers, and oxygen equipment. PTs will:

15.18.1.1. Preflight aircraft supplemental oxygen equipment. **(T-3)**

15.18.1.2. Advise and aid LMs in positioning and securing oxygen equipment. **(T-3)**

15.18.1.3. Brief crew and jumpers prior to the first mission on physiological problems that may be encountered, the importance of proper pre-breathing, and any special requirements. **(T-3)**

15.18.1.4. Advise the PIC, crew, jumpers, and other personnel on the use of oxygen equipment and on the depressurization schedule. **(T-3)**

15.18.1.5. Monitor personnel, aircraft and supplemental oxygen equipment, and aircrew flight equipment. **(T-3)**

15.18.2. The aircrew or the mission PT will notify USAF Flight Medicine (USAF/SG3PF) (Defense Switching Network (DSN) 761-7604), and AMC Deputy Chief Flight Surgeon (AMC/SGPA) (DSN 779-6305) and appropriate Command Coordinator for Aerospace Physiology, for any incident involving DCS or loss of consciousness by the most expedient manner. **(T-3)**

15.19. High Altitude Airdrop Conduct of Operations.

15.19.1. For communications and signals, interphone and hand signals are the primary methods of communications. Written messages may be necessary in some instances to communicate with individuals not connected to the aircraft interphone. LMs will carry a suitable writing utensil and medium to write out messages that cannot be dealt with by using hand signals. **(T-3)** When dropping parachutists, the jumpmaster may monitor interphone. The LM will coordinate all hand signals with the jumpmaster. **(T-3)**

15.19.2. Crewmembers will wear parachutes or restraining harnesses in the cargo compartment any time the doors are open during high altitude airdrop operations. **(T-3)** Safety harnesses are worn on airdrops conducted above 25,000 feet MSL. **Exception:** PTs may wear a parachute on drops above 14,000 feet MSL but will not position themselves near an open exit. **(T-3)** LPUs must be worn with parachutes for operations over bodies of water with the doors open. **(T-3)**

15.19.3. If an oxygen console is used, the LM will be stationed aft of it to perform in-flight duties. **(T-3)** The other LM and physiology technician will be on interphone and normally forward of the oxygen console, if used, to perform in-flight duties. **(T-3)** This arrangement will provide a buddy system to check everyone on oxygen.

15.19.4. Maintain interphone contact between the cockpit and the cargo compartment. Both LMs must be on interphone from completion of pre-slowdown checks until execution of the completion of drop checklist and the cabin altitude is below 14,000 feet MSL. **(T-3)** The jumpmaster may also monitor interphone during high altitude personnel airdrops.

15.20. High Altitude Personnel Airdrop Procedures. CAUTION: Ensure any paratroopers remaining on-board de-arm their parachutes before cabin altitude descends below set parachute activation altitudes.

15.20.1. Air deflectors must be operational if paratroop doors are used. **(T-3)** If an air deflector door does not extend, do not open the affected troop door. **Note:** Jump platforms may be used. **WARNING:** The aircraft ramp and door and paratroop door(s) will not be open at the same time. **(T-2)**

15.20.2. When parachutists exit from the ramp, all parachutists, with exception of the jumpmaster, will stand forward of the ramp hinge until the five-second advisory. **(T-2)** One or both paratroop door(s) may be used in lieu of the cargo ramp. The ramp and door or paratroop door may remain open during racetracks if required, provided racetrack altitude is at or above a safe drop altitude and paratroopers are rigged for high altitude airdrops.

15.20.3. For jumpmaster-directed HALO drops, the green light may be turned on one minute prior to the release point. The navigator will provide a standard "green light" call at the jointly agreed upon release point. **(T-3)** User assumes responsibility for drop accuracy.

15.20.4. Detailed coordination with the jumpmaster will be conducted to determine the release point and appropriate green light time based on winds, jumper experience, and parachute capabilities. **(T-3)** Ideally, a coordinated safety box (cone), similar to a LAR, should be established to allow the crew to back up the jumpmaster. In all cases, no jumpers should exit after the red light is turned on. Normally, the jumpers will exit the aircraft at their own discretion. However, their exit must occur during the coordinated safety box. **(T-3)**

15.21. High Altitude Cargo Airdrop Procedures. Conduct high altitude cargo drops using RVAD, GRADS, ICDS/JPADS, or radar beacon procedures. Heavy equipment airdrops above 14,000 feet MSL will be rigged with the Extraction Parachute Jettison System (EPJS) regardless of the size of the extraction chute used. **(T-2)** EPJS is mandatory for JPADS 10K Extracted (Heavy Equipment) Airdrop above 14,000 Feet MSL. **(T-2)**

15.22. Personnel Airdrops.

15.22.1. In the event user personnel plan to jump with mixed parachute types, aircrews will always fly to and drop off the CARP for the main mass of paratroopers at a drop altitude that is at or above the minimum drop altitude for all chute types. **(T-3)** The user assumes responsibility for the drop accuracy of individuals who choose to jump along with the main body of troopers while using a different type parachute. Aircrews will inform user jumpmasters if significant differences exist between CARPs. **(T-3)**

15.22.2. The LM allows the jumpmaster access to the paratroop doors not later than the one minute advisory. **Exception:** The jumpmaster needs a minimum of two minutes in the door for JMD drops. The LM then takes a position on the cargo ramp to provide maximum maneuverability for jumpmasters and safety personnel to perform their duties. **WARNING:** During personnel airdrops, the LM will not position themselves directly under the center anchor cable supports (A-Frame, FS 737) in case of anchor cable or support mounting failure. **(T-2) Note:** At no time will both paratroop doors be opened for paratroop drops if only one LM is on board. **(T-1)**

15.22.3. Upon seeing the red jump lights illuminate, the primary LM will notify the jumpmaster or safety personnel of the red light condition. **(T-3)** The LM will count, if possible, any parachutists that exit while the red light is illuminated. **(T-3) WARNING:** Do not attempt to physically stop or hinder jumpers from exiting the aircraft if jumpers continue to exit after "red light."

15.22.4. Control of the paratroop doors revert back to the LM after all parachutists have exited or remaining parachutists have been stopped by the jumpmaster or safety personnel and cleared from the paratroop door area. For racetracks, the LM will retain control of the doors until completing the next slowdown checks. **(T-3)**

15.22.5. Racetrack speeds and flap settings are flown as briefed. The paratroop door(s) may be left open with the jump platform(s) extended during racetracks if all paratroopers aft of the aft edge of the wheel-well (FS 617) are hooked up to the anchor cables. Jumpers may stand and hook up to the anchor cable with the paratroop doors open provided they are forward of FS 617. Other occupants of the cargo compartment must either be seated with a seat belt fastened, wear a restraint harness, or wear a parachute. **(T-3) WARNING:** Do not lower the paratroop doors down onto the extended jump platforms during racetracks. **(T-2)**

15.22.6. Avoid flying over water or built up areas while doors are open.

15.22.7. Static line retrieval:

15.22.7.1. The primary method of retrieval is using the static line retriever. The static line retriever will always be rigged and used for emergency retrieval of towed parachutist. **(T-3)** When using the Towed Parachute Retrieval System (TPRS) for troop door personnel airdrop, the Retrieval Assist Strap (RAS) will be used. **(T-3)** Manual static-line retrieval may be used to retrieve no more than ten static lines per paratroop door, per pass with one LM, or 20 static lines per door, per pass with two people (combination of LMs, jumpmasters, or safety personnel). Manual retriever does not require use of the TPRS system.

15.22.7.2. Jump platform(s) may be left extended during manual retrieval of static lines. However, if the retriever winch is used, the jump platform must be retracted. **(T-3)**

15.22.8. During combat, cut static lines that cannot be retrieved. On other than combat missions, if the static line retriever fails during retrieval and more than 10/20 static lines are to be retrieved from the paratroop door, manually retrieve the static lines by using a 5,000 lb. tiedown strap as follows:

15.22.8.1. Secure the hook end to a point forward enough in the cargo compartment to permit static lines to enter completely into the aircraft.

15.22.8.2. Pass the other end of the strap under the static line from the bottom up, making a "U" around the static lines.

15.22.8.3. Pull the strap forward to retrieve the static lines into the aircraft. LMs may require assistance to pull the strap forward.

15.22.9. If the static line retriever fails following a combination or tailgate drop, use the following procedure using the Prusik knot.

15.22.9.1. Take a 30-inch piece of ½-inch tubular nylon cord that is tied in a loop. Loop the cord around the static line retriever winch cable. Use a minimum of three wraps around the retriever cable to ensure locking of the ½-inch tubular nylon cord.

15.22.9.2. Pull to tighten the knot around the retriever winch cable to prevent slipping. Attach a carabineer into the ½-inch tubular nylon loop. Attach the hook end of a 5,000-lb. strap into the carabineer and pull in the static lines. The ½-inch tubular nylon cord will remain locked in place under tension.

15.22.9.3. More than one ½-inch tubular nylon cord may be attached to the winch cable using the Prusik knot to facilitate static-line retrieval. The Prusik knot may be adjusted up or down the cable as required. The knot will not slip as long as it is wrapped tightly with a minimum of three turns (more wraps equal more friction) and tension is applied.

15.23. Tailgate Airdrop Procedures.

15.23.1. Tailgate drops are those drops during which parachutists exit from the aircraft ramp. The maximum rigged weight of the parachutist is 325 lbs. Tailgate operations are approved for US and allied special operations personnel, Air Force SERE Specialists, paratroopers equipped for artic airdrops, US Army Quartermaster Center and School, Yuma Proving Ground Airborne Test Force, and units for which a combination drop is their normal method of deployment.

15.23.2. Rig both anchor cables and static line retrievers before takeoff to provide maximum mission flexibility. Mission commanders may approve rigging only one cable and static line retriever winch if coordinated with the jumpmaster.

15.23.3. Use one anchor cable for each pass and limit each pass to a maximum of 20 parachutists. If more than one pass is required, alternate anchor cables, retrieving static lines and deployment bags prior to each additional pass to prevent entanglement. Static lines are retrieved using aft controls. **Note:** To ensure full utilization of the aircraft during training, over-the-ramp personnel airdrops may be made with center-aisle seats installed to approximately FS 650 (aft of escape ladder). When more than 20 static line parachutists are to be dropped on a single pass, the paratroop doors will be used. **(T-3)**

15.24. Combination Airdrops.

15.24.1. Combination drops are those during which parachutists exit from the aircraft ramp after equipment extraction or gravity release (CDS, Combat Rubber Raiding Craft (CRRC), Container Ramp Bundle, etc.).

15.24.2. Combination drops are restricted to single-ship or last aircraft of an equipment formation. When tailgating parachutists, the drop altitude is determined by the item requiring the highest drop altitude per AFMAN 11-231. If an additional pass is required to drop all the

personnel after a combination CDS drop, close the ramp and door and re-rig the static-line retriever cable as depicted in T.O. 1C-130A-9.

15.24.3. The navigator will compute a CDS or platform CARP and a personnel CARP (for ten seconds after the equipment release point) using the same IAS and altitude used for the equipment. **(T-3)** Inform the jumpmaster if the PI falls within 150 yards of the DZ boundary; the jumpmaster is the final approving authority in this situation.

15.25. Door Bundle Airdrops.

15.25.1. General A-7A or A-21 containers weighing up to 500 lbs. (excluding the weight of the parachutes) are referred to as "door bundles" and are dropped from the aircraft through the paratroop door or ramp and door using the personnel airdrop checklist. Door bundles may be dropped independently or with personnel and are limited to one bundle per exit used or two bundles per exit when utilizing Caster Assisted A-Series Delivery System (CAADS). When dropped with personnel, the bundle is the first object to exit the aircraft. Remove restraints and position the bundle in the paratroop door or the ramp prior to completion of the slowdown checklist. **Exception:** If the jumpmaster needs the paratroop door for spotting, place the door bundle as close as possible to the paratroop door. If jumpers are to follow the door bundle, the user is responsible for ejecting the bundle out the troop door or off the ramp. For door bundles exiting over the ramp, secure the forward end of the bundle to a suitable floor tiedown ring with one-half inch tubular nylon. This tie is to prevent premature release of the bundle and will be cut by the LM at the release point. **(T-3)**

15.25.1.1. Door bundles dropped from the paratroop doors will be rigged with non-breakaway static lines.**(T-3)** Their dimensions, including the parachute, must not exceed 48 inches by 30 inches by 66 inches unless authorized in a specific T.O. **(T-2)** When the container is placed in the door for airdrop, the largest dimension will be placed in the vertical or upright position. **(T-3)** The parachute must be placed on top of the load, or toward the inside of the aircraft. **(T-3)**

15.25.1.2. Door bundles dropped from the ramp and door will be rigged with a T-10 parachute (converted for cargo) or parachute equipped with breakaway static lines (per T.O. 13C7-1-11, *Airdrop of Supplies and Equipment: Rigging Containers)*. **(T-2)** Also, bundles rigged for a ramp exit are equipped with a skid board compatible with the center roller conveyors. **Note:** If no parachutists are to be dropped after the door bundles, non-breakaway static lines will be used. **(T-3)** Anchor cable stops will be positioned as depicted in T.O. 1C-130A-9 for CDS airdrops. **(T-3)**

15.25.2. During unilateral single-ship airdrop training, door bundles will not exit aircraft after a paratrooper has jumped. **(T-3)** **Note:** During joint training, combat or contingency operations, the user determines door bundle requirements and order of exit from and or all personnel airdrop aircraft in the formation.

15.25.3. When door bundles are dropped with personnel, compute the CARP for the first paratrooper exiting after the bundle and compute an additional CARP for the door bundle to ensure that it will impact on the DZ. Release the bundle at the personnel CARP, followed by the parachutists when the door is clear. When a door bundle is the only object dropped, base the CARP on the bundle.

15.26. Equipment Airdrops. Only equipment rigged in accordance with 13-C series T.O.s or Joint Special Operations Command (JSOC) 350 series may be airdropped. **(T-1)** The maximum airdrop load to be extracted over the ramp is 42,000 lbs. for C-130H airplanes. The aerial delivery unit supporting the load movement ensures publications are available for LM reference during joint inspections.

15.27. Heavy Equipment airdrops with EPJS. LMs must receive EPJS ground training before using the system during airdrop missions. **(T-3)**

15.28. CDS Airdrops.

15.28.1. Reset flaps according to the appropriate CDS flap setting chart and maintain level flight. It is not recommended to drop CDS at GWs less than 104,000 lbs. If drop must be made, use zero flaps and expect longer than normal exit time. **(T-3)** **CAUTION:** The aircraft will tend to pitch up as the load exits the aircraft. This pitch must be controlled to allow no more than two or three degrees additional pitch. **(T-3)** Do not over control to the point that negative "G" forces are encountered while the load is exiting the aircraft as this increases exit time or may stop the load movement. **CAUTION:** Dropping high altitude CDS bundles at 17,000 feet or above requires proper yoke compensation for shift in CG as the load exits. Premature yoke inputs, over compensation, or no yoke inputs all may result in aircraft tail impacts by exiting bundles.

15.28.2. When the LM calls "load clear", the flaps will be set to 50%. **(T-3)**

15.28.3. LMs are permitted to pull down sharply with a gloved hand or on a tiedown strap looped over the static-line retriever winch cable to assist the cut of the release gate. LMs will only pull on the cable after hearing and seeing "GREEN LIGHT." **(T-3)**

15.28.3.1. A manual gate cut is defined as using a knife to cut/release the CDS/intermediate gates. LMs will not cut release gates while in the paratroop doors next to the exiting bundles. **(T-3)** LMs will ensure they hear and see "GREEN LIGHT" before manually cutting the CDS/intermediate release gate. **(T-3)** **Exception:** For LCLA airdrops, "GREEN LIGHT" must be seen or heard by the LM prior to releasing the load. **(T-3)**. LMs are allowed to go aft of the buffer stop/alternate forward barrier to manually cut the release gate. Exercise caution to remain clear of exiting bundles. All single stick container loads (CVR and non-CVR) may be released using manual gate cut procedures. Double stick CDS that is released simultaneously will only be cut using the static-line retriever or WGRS. **(T-3)**

15.28.3.2. When performing a manual gate cut, enter "N/A" into the not used blocks and annotate "Manual Gate Cut" into the Remarks block on the applicable DD Form 1748-X series, *Joint Airdrop Inspection Record*. **(T-3)**

15.28.4. Airdrops at or above 3,000 feet AGL are normally conducted with high-velocity parachutes. When necessary for operational missions, airdrops at or above 3,000 feet AGL may be accomplished with low-velocity parachutes with prior coordination through theater CAOC/AMD, and with concurrence of the user and AC. The user must understand accuracy utilizing low-velocity parachutes above 3,000 feet AGL will be diminished. User must accept responsibility for final bundle condition and the potential diminished accuracy of airdrop loads. **(T-3)**

15.28.5. LMs will ensure all CDS bundles (high or low-velocity) are rigged in the following static-line configurations:

15.28.5.1. Non-Breakaway: CDS loads rigged with low-velocity chutes dropped below 1,000 feet AGL will be rigged non-breakaway. **(T-3)** CDS loads rigged with high-velocity parachutes dropped below 2,000 feet AGL will be rigged non-breakaway. **(T-3) Exception:** LCADS-LV parachutes will always be rigged for breakaway regardless of altitude. **(T-3)**

15.28.5.2. Breakaway: CDS loads rigged with low-velocity parachutes above 1,000 feet AGL or high-velocity parachutes above 2,000 feet AGL may be rigged with breakaway or non-breakaway. CDS loads dropped at 10,000 feet MSL and above will be rigged and airdropped with breakaway static lines regardless of AGL altitude. **(T-3)**.

15.28.5.3. Release-away: JPADS loads will be rigged and airdropped with release-away static lines regardless of planned drop altitude. **(T-3)**

15.28.6. Release-away, breakaway, and non-breakaway static lines for CDS airdrops (contingency and training), will be rigged utilizing the anti-oscillation tie. **(T-3) Exception:** The anti-oscillation tie is not required for a single non-breakaway bundle per cable, per pass. Additional bundles may be rigged on the same/opposite cable without anti-oscillation ties if dropped on separate passes. **(T-3)**

15.29. Combat Rubber Raiding Craft (CRRC) Airdrops. The T.O. 1C-130XX-1 CDS Airdrop Checklist will be used. **(T-3)** Either two CRRC platforms and up to 18 static- line parachutists or one CRRC platform and up to 19 parachutists may be airdropped on one pass. Wind and sea state limitations are at the discretion of the supported unit. **Note:** When airdropping two CRRC platforms, the forward release gate must be cut manually by the LM.**(T-3)** When dropping one CRRC, either use the static line retriever or manually cut the release strap.

15.30. Free-Fall Airdrops. The T.O. 1C-130XX-1 CDS Airdrop Checklist will be used. **(T-3)** Single containers not exceeding weight or dimension restrictions for door bundles may be dropped from either troop door using the personnel airdrop checklist.

15.31. High Velocity CDS Airdrops. The T.O. 1C-130XX-1 CDS Airdrop Checklist will be used. **(T-3)** Units must establish a marking system to readily identify which 26-foot parachutes are packed for breakaway and non-breakaway static lines. **(T-3)** The aircrew must ensure the CDS loads and the high-velocity parachutes are rigged, packed, and marked properly for the planned airdrop altitude (MSL). **(T-3)**. Aircrew procedures must be consistent with parachute packing. **(T-3)**

15.32. Container Ramp Bundles. The T.O. 1C-130XX-1 CDS Airdrop Checklist will be used with the exception of arming the CDS switch. **(T-3)** CDS flap settings must be computed and used to ensure a positive deck angle for the drop. **(T-3)**

15.32.1. Current items considered ramp bundles are: Rigging Alternate Method Zodiac (RAMZ) rigged in accordance with TM 4-48.04/T.O. 13C7-51-21, *Airdrop Of Supplies and Equipment: Rigging Loads for Special Operations*, and One or Two Motorcycles on a Combat Expandable Platform rigged in accordance with TM 4-48.08/T.O. 13C7-2-491, *Airdrop of Supplies and Equipment: Rigging Military Utility Vehicles*. Ramp bundles will be loaded and rigged in the aircraft in accordance with Section 7-IIA of the aircraft T.O. 1C-130A-9. **(T-2)**

15.32.1.1. RAMZ containers are jumpmaster-directed ramp bundle drops regardless of the type parachute used by the STT. The jumpmaster may use streamers and request additional passes to position the aircraft over the containers and STT release point. Containers are individually secured to the ramp with Type VIII nylon, which is manually cut by the LM on the jumpmaster's command. The STT may exit immediately after container release or on a subsequent pass.

15.32.1.2. For jumpmaster-directed RAMZ airdrops, a navigator's CARP/HARP is not required when using streamers/spotter chutes.

15.32.1.3. For single-pass RAMZ airdrops, compute the CARP/HARP for the RAMZ by dividing the packages weight in two and applying this result to the ballistic data for a single, personnel T-10A/B parachute. If STT personnel jump on the same pass with the RAMZ, combination drop procedures apply.

15.32.2. Alternate Navigator Directed RAMZ Deployment.

15.32.2.1. Accomplish the slowdown using normal procedures.

15.32.2.2. Release point. The navigator determines the release point and assumes the responsibility to call "five seconds" and "green light." At green light, the LM will manually cut the RAMZ bundle loose, which will signal the jumpers are clear to follow the gravity ejected load. **(T-3)**

15.32.3. RAMZ Preflight. Prior to flight, the LM will ensure the following items are accomplished: ensure fuel is not leaking from the RAMZ bundle; a leaking bundle will not be loaded aboard the aircraft or will be downloaded if already aboard. **(T-3)** If one or more RAMZ with fuel are loaded aboard the aircraft the day prior to flight, the fumes may be decreased/eliminated by venting the aircraft overnight. Close both paratroop doors onto the extended jump platforms and secure them with tiedown straps. **WARNING:** If flammable fumes are present, unnecessary electrical equipment/switches will not be turned on or off until the fumes are eliminated. **(T-3)** Use 100 percent oxygen and accomplish the Smoke and Fume Elimination checklist as appropriate.**(T-3) WARNING:** Only 15-foot static line will be used on the RAMZ cargo parachutes. **(T-2)** A 12-foot static line extended to 15-feet will not be used. **(T-2)** If personnel (rigged for static line airdrop) are to follow immediately after the RAMZ, their static lines will also be 15-feet. **(T-2) Note:** When loaded aboard the aircraft, the vertical restraint tiedown strap on the RAMZ will be secured in such a manner that it is not placed over any fuel bladder, and just tight enough to take the slack out of the strap. **(T-3)**

15.32.4. RAMZ Deployment:

15.32.4.1. During the slowdown checklist, vertical, aft and forward restraint straps will be removed from the RAMZ package. **(T-3)** Gradually release the forward restraint to allow the package to slowly shift forward against the Type VIII nylon release strap. **WARNING:** Personnel must stand clear of the RAMZ package when removing the forward restraint. **(T-3)**

15.32.4.2. At the "one minute" call, the jumpmaster will normally be on the left side of the cargo ramp and may be spotting from the aft end. Additional jumpers will be forward of the RAMZ. **(T-3)** The LM will be positioned to retrieve the RAMZ parachute static line D-bag(s) (for HALO airdrops) and to observe equipment and jumpers at all times. **(T-3)**

At the "one minute" call, the jumpmaster will be alerted and the Type VIII nylon release strap is rechecked. **(T-3)** **WARNING:** If a "no drop" is called and the RAMZ is held in place by only the release strap, all personnel will move forward of the ramp hinge, except the LM and the jumpmaster who will monitor the RAMZ for possible shifting and secure as necessary. **(T-3)**

15.32.4.3. If the deployment is JMD, the jumpmaster will determine the exit point and deploy prior to receiving a "no drop" notification or seeing the red light come on. **(T-3)** The LM will relay to the pilot all visual corrections given by the jumpmaster. **(T-3)** The jumpmaster will signal for the LM to cut the Type VIII nylon release strap. **(T-3)**

15.32.4.4. If the deployment is navigator directed, the LM will relay pertinent information to the jumpmaster. **(T-3)** At the command "green light", the LM will cut the Type VIII nylon release gate and deploy the RAMZ. **(T-3)** If jumpers are tailgating, this will signal the jumpers that they are cleared to follow the load. If jumpers are freefall parachuting, they will exit after the LM has retrieved the RAMZ parachute D- bags. **WARNING:** If the RAMZ exits the aircraft, but fails to properly deploy, the static lines will be cut immediately. **(T-3)** **CAUTION:** The Type VIII nylon release strap must be cut below the knot to allow the nylon strap to pull free through floor tiedown rings. **(T-3)**

15.32.5. The RAMZ package is normally delivered aligned into the wind (+/- 30 degrees) when the wind is 5 knots or greater. The jumpmaster will be advised when this cannot be complied with. **(T-3)**

15.32.6. The minimum deployment altitude will be 3500 feet AGL when the STT exits using freefall parachutes. **(T-3)** Higher altitudes may be used for training. For operational missions, minimum altitude with the freefall parachutes is 2500 feet AGL. If low ceilings prohibit the use of freefall parachutes, the STT will deploy using static line parachutes immediately following the RAMZ package. The RAMZ and STT will be deployed from the same altitude. **(T-3)** The minimum deployment altitude for both RAMZ and STT is 800 feet AGL.

15.32.7. For training, position one or more safety recovery boats to recover equipment and personnel as required.

15.33. Low Cost Low Altitude Airdrop (LCLA). LCLA airdrop is an aerial delivery system consisting of low-weight airdrop bundles deployed from the aircraft ramp and door at very low altitudes, enabling circular error accuracy within 100 meters. This airdrop is appropriate for employment within or near a Forward Operating Base (FOB) or close to troops.

15.33.1. Joint Airdrop Inspection. Accomplish JAI on all bundles utilizing the DD Form 1748-1, *Joint Airdrop Inspection Record (CDS/CEP/LCLA)*, in accordance with AFJI 13-210 *Joint Airdrop Inspection Records, Malfunction/Incident Investigations, and Activity Reporting*. For bundles to be repositioned, annotate “to be rigged in-flight” in the remarks section of the DD Form 1748-1.

15.33.2. Drop Altitude. LCLA resupply drop altitude is dependent upon the type of parachute being used. However, it will not be lower than 300 feet AGL. **(T-3)** The primary altitude reference should be the planned MSL drop altitude based on the most accurate altimeter setting available. It is critical to cross-check the radar altimeter against the MSL altitude during the run-in.

15.33.3. NVG LCLA Airdrop. Aircrews will follow applicable night NVG VMC procedures. **(T-3)** Minimum night NVG LCLA drop altitude is 300 feet AGL. Aircrews are responsible for thorough objective area analysis to ensure aircraft safety. Situation permitting, notify the user if airdropping above the expected LCLA altitude (above 300 feet AGL).

15.33.4. LCLA training airdrops are authorized with SATBs and may be conducted at LCLA altitudes (no lower than 300 feet AGL day or night (on NVGs)).

15.33.5. The surface wind limits for actual LCLA is 17 knots and for SATB LCLA simulation airdrop is 25 knots. The minimum DZ size for LCLA during training is the same as CDS minimum DZ size computed in accordance with DAFMAN 13-217.

15.34. SATBs. A 15-lb. training bundle may be dropped to simulate personnel, equipment, CDS or LCLA airdrops. Use the applicable tactical airdrop checklist for the type airdrop being simulated. **Exception:** The LM will use the equipment checklist for simulated CDS airdrops. **(T-3)** SATBs may be dropped on the actual heavy equipment or CDS CARP for sight angle airdrop training provided the bundle will land on the DZ. Adjust the drop score for the difference between the SATB CARP and the actual CARP.

15.35. NVG Airdrop Procedures. Certified NVG airdrop pilots and navigators are authorized to perform normal night operations (including low level flying and formation) at night VMC altitudes in accordance with the tactical chapters of this manual and AFTTP 3-3.C-130H.

15.35.1. LMs will use NVGs during airdrops if the mission dictates. **(T-3)** LMs are authorized to perform airdrops with minimum lighting. Use NVGs as necessary to assist with operations and keep cargo area lighting to a minimum.

15.35.2. Cargo Compartment Lighting. After the Combat Entry Checklist, all cargo compartment lighting will be minimized. **(T-3)** Blacked out (no-light) operations in the cargo compartment are not authorized. **(T-3)** LMs will carefully consider cargo compartment lighting intensity prior to opening ramp and door to minimize interference with formation wingmen's NVG vision. **(T-3)**

15.36. Emergency Procedures. LMs will complete a detailed emergency procedure coordinated task briefing. **(T-3)** All crewmembers should review the applicable emergency procedures for the airdrop to be performed before takeoff. **Note:** In the event of a malfunction, incident, or off-DZ drop, do not de-rig, handle or move items unless required for safety of flight. Any follow-on investigation will benefit from seeing the items in the position or state they were in at the time of the event.

15.37. Emergency Parachutist Bail Out Procedures.

15.37.1. Under satisfactory conditions (static-line exit), the minimum acceptable emergency bailout altitude is 550 feet above the terrain. When an aircraft emergency occurs during static-line airdrops, the PIC maintains an acceptable attitude and altitude for the parachutists to evacuate the aircraft. If the jump must be made at an airspeed in excess of 150 KIAS, advise the parachutists of the airspeed and altitude. **(T-3)** Order evacuation by turning on the green light and giving the briefed alarm bell signals.

15.37.2. Minimum emergency bail-out altitude for free-fall parachutists is 2,000 feet AGL.

15.37.3. If conditions are unsuitable for aircraft evacuation, turn the red light on until exit doors are closed. The PIC advises the jumpmaster through the LM to have the parachutists unhook, take their seats, and fasten seatbelts.

15.38. Towed Parachutist.

15.38.1. The jumpmaster will stop the remaining parachutists, the LM will notify the PIC, and the PM will turn on the red light. **(T-3)** The PF will maintain drop airspeed, at least the minimum drop altitude (AGL) for the type parachute being used, and avoid flying over or up wind of water or built up areas. **(T-3)**

15.38.2. Crews should suspect they have a towed parachutist if static lines are not fully tucked into the upper corner of the paratroop door or if a D-bag appears to be stuck outside the door. It is unlikely for a D-bag to become caught on the outside of the aircraft and is a probable indicator a parachutist is being towed. In any case, crews should follow emergency procedures until they have confirmed no parachutist is being towed. Crews should take special effort to confirm towed jumper status at night with limited rearward visibility. They should consider using an additional source of illumination to view the rear of the aircraft.

15.38.3. The jumpmaster or safety observer is responsible for identifying how the parachutist is towed. If being towed by anything other than the static line, the jumpmaster or safety will attempt to free the parachutist. **(T-3)** If being towed by the static line, the jumpmaster or safety will make a recommendation to the PIC, through the LM, whether to retrieve the parachutist or cut him or her free. **(T-3)** If all parachutists have exited and there is no safety person onboard, this responsibility rests with the LM.

15.38.4. The PIC will make the final decision whether or not to cut the towed parachutist free. **(T-3)** If the decision is to cut the parachutist free, the LM will cut the static line on the PIC's command.**(T-3) Note:** Towed parachutists indicate consciousness and that reserve parachute is ready by maintaining a tight-body position with both hands on reserve parachute. This indicates the jumper is prepared to be cut away.

15.38.5. If the parachutist is towed after exit from a paratroop door, the pilot should lower the landing gear and set flaps to 100 percent to reduce parachute buffeting. (See **WARNING** below.) If possible, avoid turning the aircraft in the direction of the towed parachutist as this often causes parachutist to swing violently and increases the possibility of injury. All turns should be shallow and coordinated to reduce the severity of parachutist oscillation. During training, the first priority is to retrieve the parachutist whether conscious or unconscious. However, if the parachutist cannot be retrieved and indicates consciousness, cut the parachutist free. **WARNING:** Although 100 percent flaps selection provides an improved airflow for a towed parachutist, under certain conditions the landing gear down, 100 percent flap configuration may reduce aircraft performance. The PIC must consider density altitude, aircraft weight, position in formation, or other factors deemed important in determining what flap setting between 50 and 100 percent should be used. **(T-3)**

15.38.6. For a parachutist towed after exit from the cargo ramp and door, the first priority is to cut the parachutist free if consciousness is indicated. Retrieve if the parachutist is unconscious, does not signal, cannot be observed, or if a condition exists that prevents cutting the static line. **Note:** If the parachutist is towed following a ramp exit, it will be necessary to partially rewind the static-line retriever to reach the static line for cutting.

15.38.7. Parachutist retrieval through paratroop door using TPRS. The primary method of retrieval is use of the TPRS.

15.38.7.1. Install the retrieval sling assembly (choker) around all static lines immediately below the static line snap hooks.

15.38.7.2. Install RAS around all static lines.

15.38.7.3. Fold in jump platform.

15.38.7.4. Using the static line retriever winch, retrieve the static lines through the RAS. If the static line retriever winch has been modified with the slip clutch assembly, engage static line retriever winch until it slips. If the retriever clutch slips prior to bringing the parachutist into the paratroop door area, determine and remove the cause of the overload, slightly unwind the static line retriever winch to reset the slip clutch, and continue retrieval operation. **WARNING:** During retrieval attempts, take all possible action to ensure the parachutist does not slip back at any time. This does not preclude unwinding the retriever to reset the slip clutch, if necessary.

15.38.7.5. Stop retrieval when the cotton sleeve at the apex of the D-bags begin to pass through the RAS.

15.38.7.6. If in the paratroop door area, bring the parachutist into the aircraft by hand. If the parachutist is not in the paratroop door, e.g., positioned in the lower aft corner of the paratroop door, it is necessary to pull the D-bags manually through the RAS. Primary LM maintains control of the static line retriever pistol grip. Secondary LM and safety observer or jumpmaster (if safety observer or jumpmaster are onboard the aircraft) routes the D-bags through the RAS. Once the D-bags have been brought into the aircraft, manually pull them far enough forward so they do not interfere with the remaining retrieval. The primary LM will continue retrieval. **(T-3)** When pulled up to the door, bring the parachutist into the aircraft by hand. **WARNING:** All personnel should remain clear of the paratroop door and the line of travel of the static line retriever cable until the parachutist has been retrieved to the door area. **Note:** When the parachutist is in the door area and is under the control of the LM or safety observer, or jumpmaster, slightly unwind the static line retriever to relieve tension on the line so the parachutist can be brought into the aircraft. The jump platform may be extended once the parachutist is in the door area.

15.38.7.7. After retrieving the parachutist, the pilot will reset flaps to 50 percent, raise the landing gear (if required), and call for completion of drop checklist. **(T-3)**

15.38.8. Parachutist Retrieval Through Ramp and Door. **WARNING:** The TPRS shall not be used during parachutist retrieval through ramp and door. **(T-3)**

15.38.8.1. Thread the hook end of the 5,000-lb. tiedown strap, front to rear, around the right/left vertical support member at FS 840 approximately 5-1/2 feet above the ramp in the ADS position. Attach the hook end into the strap and draw taut. Run the ratchet end of the strap across the ramp and thread it, front to rear, around the opposite vertical support member at FS 840. Remove all slack from the strap and attach the ratchet end to any convenient tiedown ring forward of FS 840. Ratchet the strap until taut. **Note:** For aircraft with tiedown rings installed at FS 847 (waterline 208), the 5,000-lb. tiedown strap may be installed by attaching the hook end of the strap to the sidewall ring at FS 847 on the same

side as the towed parachutist with the hook facing forward. Hook the ratchet end of the strap to the opposite sidewall ring at FS 847, remove all the slack from the strap, and ratchet the strap until taut. The strap will be pre-measured and the excess strap taped prior to the completion of the pre-slowdown checklist. **(T-3)**

15.38.8.2. Using the static-line retriever, retrieve the static lines over the strap and as the parachutist is pulled up to the ramp, bring the parachutist into the aircraft by hand underneath the strap. **WARNING:** The last 5 feet are the most crucial for the towed parachutist. An oscillating parachutist usually strikes the aircraft head first. If the parachutist is oscillating violently, stop the retrieval momentarily to allow stabilization, and then continue with retrieval. Repeat these steps as required. **Note:** After the parachutist is pulled up to the ramp and is being controlled by the jumpmaster, safety observer or LM slightly unwinds the static-line retriever to relieve tension on the line so the parachutist can be brought into the aircraft.

15.38.8.3. After retrieving the parachutist, run the completion of drop checklist. **WARNING:** There is no effective, dependable, or consistently reliable means to manually retrieve a towed parachutist from the paratroop door or ramp and door. Manually retrieving a parachutist is a last resort. Manual retrieval techniques vary, depending on the scenario, and should be used with extreme caution.

15.39. Equipment Emergency Procedures.

15.39.1. When notified of a malfunction, the PF will maintain drop airspeed and AGL altitude (if possible) and avoid flying over or upwind of water or built up areas to the maximum extent possible. **(T-3) Note:** Make no further attempt to airdrop the platform. **WARNING:** Exercise extreme caution when manually cutting the extraction line. Platforms could dislodge from restraint chains, or a malfunctioning EPJS could suddenly initiate the squib and release the extraction line. In all cases, the extraction line will rapidly recoil after the cut. **WARNING:** The combined effects of aircraft GW, drop altitude, and temperature may prevent level flight at drop speed when towing deployed extraction parachutes as small as 22 feet. Total drag on the aircraft may be more than the thrust available to overcome it. The situation could require an immediate forced landing near the DZ.

15.39.2. For multiple 28-foot extraction parachutes deployed outside the aircraft, if the load cannot be jettisoned and flight conditions permit, proceed to a suitable airfield, avoid flying over built up areas and land in a flat attitude with ramp and door open.

15.39.2.1. **WARNING:** With multiple 28-foot extraction parachutes deployed outside the aircraft, maximum thrust will be needed to stay aloft or to control the descent. The drag produced by the extraction parachutes should decrease if airspeed is allowed to bleed off. This reduction in drag could permit level flight or reduce the rate of descent should level flight not be possible.

15.39.2.2. Do not reduce power to achieve this air speed change and do not slow below max effort takeoff speed. Max effort takeoff speed is 1.2 times power on stall speed and provides an acceptable airspeed margin for zero bank angle. If the aircraft must be turned to get to a suitable landing area, this airspeed may not be sufficient to prevent a stall while in banked flight. If a turn is required, pilots should be sensitive to the first indication of a

stall and reduce bank and or lower nose to decrease angle of attack and eliminate the stall indication. Any power reduction will increase the stall speed.

15.39.2.3. The tradeoff in selecting a landing site, straight ahead or one requiring a turn is a function of the rate of descent the required airspeed will produce. The higher the airspeed, the faster the aircraft will likely descend. A forced landing straight ahead will produce the lowest allowable airspeed, least rate of descent and most desirable impact forces. Any turn will decrease the time before impact. However, the risks associated with turning may be mitigated by the terrain the aircraft will impact such as forest or built up areas.

15.39.3. Upon landing, the PIC will ensure the load and airdrop system is not tampered with until after the malfunction is investigated by tactics/standardization and evaluation personnel. **(T-3)**

15.40. CDS Emergency Procedures.

15.40.1. **WARNING:** When notified of a malfunction, extend additional flaps and lower the nose to maintain a slight nose down attitude until the ramp and door are closed and the load is secured. Maintain drop airspeed and AGL altitude (if possible) and avoid flying over or upwind of water or built up areas.

15.40.2. If a malfunction is due to a failure of the static-line retriever or CDS remote timer system, the mission may be continued provided the 80 lb. tie on the knife did not break, and the knife did not nick the gate. Use the opposite static line retriever and manually activate the retriever switch at FS 245 for three seconds or perform a manual gate cut. The DD Form 1748-2, *Joint Airdrop Malfunction Report (Personnel-Cargo)*, is not required, but a write-up in the AFTO 781A is required. **(T-3)**

15.41. High Altitude Emergency Procedures. If a physiological incident occurs, the PIC will:

15.41.1. Abort the mission. **(T-3)**

15.41.2. Begin descent (pressurization and descent will be determined by the type and degree of sickness or pain). **(T-3)**

15.41.3. Ensure the affected person remains on 100 percent oxygen until a medical doctor determines the type of treatment required. **(T-3)**

15.41.4. Proceed to the nearest base with qualified medical assistance available. **(T-3)**

15.41.5. Advise the control tower of the emergency and request an ambulance meet the aircraft. **(T-3)**

15.41.6. Advise attending physician to call USAF Hyperbaric Medicine Division; during duty hours call DSN 554-3483 or (210) 292-3483 and after duty hours call DSN 554-5990 or (210) 292-5990. For out of area medical assistance, call Divers Alert Network (DAN) at 1-800-446-2671. **(T-3)**

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

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Abbreviations and Acronyms

ACBRN—Aircrew Chemical, Biological, Radiological and Nuclear

AC—Aircraft Commander

ACFP—Advanced Computer Flight

ADI—Attitude Director Indicator

ADF—Automatic Direction Finder

ADIZ—Air Defense Identification Zone

ADE—Airdrop Damage Estimate

AE—Aeromedical Evacuation

AECM—Aeromedical Evacuation Crew Member

AETC—Air Education and Training Command

AFE—Aircrew Flight Equipment

AFI—Air Force Instruction

AFJI—Air Force Joint Instruction

AFLCMC—Air Force Life Cycle Management Center

AFMAN—Air Force Manual

AFPD—Air Force Policy Directive

AFRC—Air Force Reserve Command

AFTO—Air Force Technical Order

AFTTP—Air Force Tactics, Techniques, and Procedures

AGE—Aerospace Ground Equipment

AGL—Above Ground Level

AGU—Autonomous Guidance Units

AIR—Aviation Into-Plane Reimbursement

ALS—Approach Lighting System

ALZ—Assault Landing Zone

AMC—Air Mobility Command

AMCC—Air Mobility Control Center

AMD—Air Mobility Division

ANG—Air National Guard

AOC—Air and Space Operations Center

AOR—Area of Responsibility

APU—Auxiliary Power Unit

ARA—Airborne Radar Approach

ARC—Air Reserve Component

ARMS—Aeromedical Readiness Missions; Aviation Resource Management System

ARTCC—Air Route Traffic Control Center

ASR—Auto Start Relay

ASRR—Airfield Suitability and Restrictions Report

ATA—Actual Time of Arrival

ATC—Air Traffic Control

ATIS—Automated Terminal Information Service

ATOC—Air Terminal Operations Center

ATTLA—Air Transportability Test Loading Agency

BDHI—Bearing Distance Heading Indicator

BSU—Bus Switching Unit

C2—Command and Control

CA—Convergence Angle

CARA—Combined Altitude Radar Altimeter

CARP—Computed Air Release Point

CB—Center of Balance

CBRN—Chemical, Biological, Radiological, and Nuclear

CDS—Container Delivery System

CDT—Crew Duty Time

CFL—Critical Field Length

CFP—Computer Flight Plan

CFPS—CFP System

CFR—Code of Federal Regulations

CG—Center of Gravity

CH—Compass Heading

CMG—Combat Mission Guide

CMT—Charge Medical Technician

CODEL—Congressional Delegations

COMSEC—Communications Security

CONOPS—Concept of Operations

CONUS—Continental United States

CORR—Correction

CRG—Contingency Response Group

CRM—Crew Resource Management

CRRC—Combat Rubber Raiding Craft

CVR—Cockpit Voice Recorder; Centerline Vertical Restraint

CVAM—Office of the Assistant Vice Chief of Staff of the Air Force, Special Air Missions Division

DA—Decision Altitude; Drift Angle

DAFI—Department of the Air Force Instruction

DAFIF—Digital Aeronautical Flight Information File

DAFMAN—Department of the Air Force Manual

DCS—Decompression Sickness

DDO—Deputy Director of Operations

DGH—Desired Grid Heading

DH—Decision Height

DME—Distance Measuring Equipment

DoD—Department of Defense

DODI—Department of Defense Instruction

DR—Dead Reckoning

DSN—Defense Switching Network

DTC—Distance to Climb

DV—Distinguished Visitor

DZ—Drop Zone

ECGW—End of Cruise Gross Weight

EFB—Electronic Flight Bag

EFI—Electronic Flight Instrument

EOD—Explosive Ordinance Disposal

EMCON—Emissions Control

EPA—Evasion Plan of Action

EPJS—Extraction Parachute Jettison System

EPOS—Emergency Passenger Oxygen System

ERO—Engine Running Onload/Offload

ESA—Emergency Safe Altitude

ETA—Estimated Time of Arrival

ETE—Estimated Time Enroute

ETP—Equal Time Point

EUCOM—U.S. European Command

EXT—External

FA—Flight Authorizations, Flight Attendant

FAA—Federal Aviation Administration

FAR—Federal Aviation Regulation

FCB—Flight Crew Bulletin

FCF—Functional Check Flight

FCG—Foreign Clearance Guide

FCI—Flight Command Indicator

FDP—Flight Duty Period

FDR—Flight Data Recorder

FE—Flight Engineer

FHR—Fuel Holding Relay

FIH—Flight Information Handbook

FL—Flight Level

FLIP—Flight Information Publications

FM—Flight Manager

FN—Flight Nurse

FOB—Forward Operating Base

FOD—Foreign Object Damage

FOM—Figure Of Merit

FOUO—For Official Use Only

FPC/FPQ—Mobility Pilot Graduate

FPM—Feet Per Minute; Flight Plan Management

FRAG—Fragmentation Order

FS—Flight Station

FSS—Forward Supply System

FSAF—First Suitable Airfield

FTC—Fuel to Climb

FTU—Formal Training Unit

GC—Grid Course

GCAS—Ground Collision Avoidance System

GCU—Generator Control Unit

GDSS—Global Decision Support System

GMRS—Ground Marked Release System

GMT—Greenwich Mean Time

GP—General Planning

GPS—Global Positioning System

GPS-RTS—Global Positioning System Retransmit System

GPWS—Ground Proximity Warning System

GRADS—Ground Radar Aerial Delivery System

GRIV—Grivation

GTC—Gas Turbine Compressor

GW—Gross Weight

HAA—Height Above Aerodrome

HALO—High Altitude Low Opening

HARP—High Altitude Release Point

HAT—Height Above Touchdown

HATh—Height Above Threshold

HATR—Hazardous Air Traffic Report

HERK—Hostile Environment Repair Kit

HERP—Hostile Environment Repair Procedure

HF—High Frequency

HH—Handheld

HQ—Headquarters; HaveQuick

HSI—Horizontal Situation Indicator

IAS—Indicated Airspeed

ICAO—International Civil Aviation Organization

ICDS—Improved Container Delivery System

IDCU—Integrated Display Computer Unit

IF—Instructor Flight Engineer

IFF—Identification Friend or Foe

IFM—Integrated Flight Management

IFR—Instrument Flight Rules

IGH—Initial Grid Heading

ILS—Instrument Landing System

IMC—Instrument Meteorological Conditions

IN—Instructor Navigator

INOP—Inoperative

INS—Inertial Navigation System

INU—Inertial Navigation Unit

IOAT—Indicated Outside Air Temperature

IP—Instructor Pilot

JA/ATT—Joint Airborne/Air Transportability Training

JFC—Joint Force Commander

JMD—Jumpmaster Directed

JMPS—Joint Mission Planning Software

JOSAC—Joint Operational Support Airlift Center

JPADS—Joint Precision Airdrop System

JPADS-MP—Joint Precision Aerial Delivery System Mission Planner

JSOC—Joint Special Operations Communications

LAR—Launch Acceptability Region

LB—Pound

LBS—Pounds

LCADS-LV—Low Cost Aerial Delivery System, Low Velocity

LCLA—Low Cost Low Altitude

LED—Light Emitting Diode

LH—Left Hand

LHA—Local Hour Angle

LM—Loadmaster

LONG—Longitude

LPU—Life Preserver Unit

LSAF—Last Suitable Airfield

LZ—Landing Zone

MAC—Minimum Altitude Capable

MAF—Mobility Air Forces

MAFFS—Modular Airborne Fire Fighting System

MAJCOM—Major Command

MAP—Missed Approach Point

MC—Mission Commander; Mission Contributing

MCAD—Mission Computer Airdrop

MDA—Minimum Descent Altitude

MDS—Mission Design Series

ME—Mission Essential

MEA—Minimum Enroute Altitude

MEFF—Maximum Endurance Fuel Flow

MEL—Minimum Equipment List

MEP—Mission Essential Personnel

MH—Magnetic Heading

MILGPS—Military Grade Global Positioning System

MISREPS—Mishap Reports

MLG—Main Landing Gear

MMD—Moving Map Display

MMO—Mission Mobility Observer

MOB—Main Operating Base

MPD—Mobility Pilot Development

MPI—Multiple Points of Impact

MPP—Most Probable Position

MR—Mission Ready

MSL—Mean Sea Level

MSA—Minimum Safe Altitude

MSE—Mission Support Equipment

MSN—Mission

MTR—Military Training Route

MXG/CC—Maintenance Group Commander

NAF—Numbered Air Force

NAS—Naval Air Station / National Air Space

NAT/HLA—North Atlantic High Level Airspace

NATO—North Atlantic Treaty Organization

NDB—Non-Directional Beacon

NGB—National Guard Bureau

NLT—Not Later Than

NM—Nautical Mile

NMR—Non-Mission Ready

NOTAM—Notices to Airmen

NSN—National Stock Number

NVG—Night Vision Goggles

NVIS—Night Vision Imaging System

OAP—Offset Aim Point

OAPs—Offset Aim Points

OAT—Outside Air Temperature

OATC—Outside Air Temperature Corrected

OCONUS—Outside the Continental United States

OCF—Operational Check Flight

OG/CC—Operations Group Commander

OGV—Group Stan Eval

OI—Open Item; Operating Instructions

OPCON—Operational Control

OPORD—Operations Orders

OPLAN—Operations Plan

OPR—Office of Primary Responsibility

OPREP—Operational Report

OPSEC—Operational Security

ORM—Operational Risk Management

OSA—Operational Support Airlift

OWS—Operational Weather Squadron

PA—Public Address

PACAF—Pacific Air Forces

PAH—Primary Assigned Hours

PAR—Precision Approach Radar

PAPI—Precision Approach Path Indicator

PBE—Protective Breathing Equipment

PBN—Performance Based Navigation

PCM—Passenger Compartment Monitor

PF—Pilot Flying

PFPS—Portable Flight Planning Software

PI—Point of Impact

PIC—Pilot in Command

PMSV—Pilot to Metro Service

PM—Pilot Monitoring

PO—PADS Operator

POC—Point of Contact

POL—Petroleum/Oils/Lubricants

PPI—Plan Position Indicator

PRM—Precision Runway Monitor

PT—Physiology Technician

RA—Resolution Advisory

RAMZ—Rigging Alternate Method Zodiac

RAS—Retriever Assist Strap

RCR—Runway Condition Reading; Reverse Current Relay

RDS—Records Disposition Schedule

RF—Radio Frequency

RNAV—Area Navigation

RNP—Required Navigation Performance

ROC—Rate Of Climb; Required Obstacle Clearance

RON—Remain Over Night

RPM—Revolutions Per Minute

RRFL—Required Ramp Fuel Load

RSC—Runway Surface Condition

RVAD—Radar Verified Airdrop

RVR—Runway Visual Range

RVSM—Reduced Vertical Separation Minimum

SAAM—Special Assignment Airlift Mission

SAASM—Selective Availability Anti-Spoofing Module

SATB—Simulated Airdrop Training Bundle

SCA—Self-Contained Approach

SCNS—Self-Contained Navigation System

SECOMP—Secure Enroute Communications Package

SERE—Survival Evasion Resistance Escape

SF—Standard Form

SID—Standard Instrument Departure

SIF—Selective Identification Feature

SII—Special Interest Item

SKE—Station Keeping Equipment

SPINS—Special Instructions

SPR—Single Point Refueling

SM—Statue Mile

SOWT—Special Operations Weather Team

SQ/CC—Squadron Commander

STAR—Standard Terminal Arrival Routes

STT—Special Tactics Team

SV—Secure Voice

TACAN—Tactical Air Navigation

TACC—Tanker Airlift Control Center

TAS—True Airspeed

TC—True Course

TCAS—Traffic Collision and Avoidance System

TDY—Temporary Duty

TDZE—Touchdown Zone Elevation

TEM—Threat and Error Management

TERPS—Terminal Instrument Procedures

TFF—Terminal Fuel Flow

TFM—Tactical Formation Maneuvering

TH—True Heading

THRE—Threshold Elevation

TIT—Turbine Inlet Temperature

TO—Technical Order

TOA—Time of Arrival

TOGW—Takeoff Gross Weight

TOLD—Takeoff and Landing Data

TOT—Time Over Target

TPRS—Towed Parachutist Retrieval System

TR—Transformer Rectifier

TTC—Time to Climb

TTP—Tactics, Techniques and Procedures

TWCF—Transportation Working Capital Fund

TWS—Track While Scan

UAB—Underwater Acoustical Locator Beacon

UHF—Ultra High Frequency

UHF-DRS—Ultra High Frequency Dropsonde Receiver Subsystem

USAFE—United States Air Forces Europe

UV—Ultra-Violet

VASI—Vertical Approach Slope Indicator

VAR—Variation

VFR—Visual Flight Rules

VIRS—Verbal Initiated Release System

VMC—Visual Meteorological Conditions

VMCA—Air Minimum Control Speed

VMCG—Ground Minimum Control Speed

VMETO—Maximum Effort Takeoff Speed

VOR—VHF Omni—directional Range

VR—Refusal Speed

VTO—Takeoff Speed

VVI—Vertical Velocity Indicator

VVOD—Vector Vertical Obstruction Database

VSI—Vertical Speed Indicator

WG/CC—Wing Commander

WHMO—White House Military Office

WRF—Wing Relieving Fuel

WX—Weather

ZN—Azimuth Angle

Terms

Terms—The following is a list of common mobility terms and associated abbreviation. Additional terms common to the aviation community may also be found in FAR, Part 1 and DoD FLIP General Flight Planning, Chapter 2.

618th AOC Tanker Airlift Control Center (618 AOC (TACC))—The 618 AOC (TACC) reports to the 18th Air Force and is the global air operations center responsible for centralized C2 of Air Force and commercial air mobility assets. Plans, schedules and tracks tanker, airlift, and aeromedical evacuation aircraft worldwide to efficiently and effectively accomplish Air Mobility Command's Global Reach mission. The 618 (AOC) TACC provides aircrews with mission details, support, training and authority necessary to successfully execute their mission.

Advanced Computer Flight Plan (ACFP)—An Air Force-level system that is used by FMs to plan the fuel and flight plan for managed sorties. The program has current aircraft models and weather feeds to produce an accurate flight plan.

Aeromedical Evacuation (AE)—Fixed-wing movement of patients requiring supervision by aeromedical evacuation crewmembers to locations offering appropriate levels of medical care.

Aeromedical Evacuation Crew Member (AECM)—Qualified Flight Nurses (FN), Aeromedical Evacuation Technicians (AET), performing AE crew duties.

Air Mobility Control Center (AMCC)—Provides global coordination of tanker and airlift for AMC and operationally reports to the 618 TACC. Functions as the AMC agency that manages and directs ground support activities and controls aircraft and aircrews operating AMC strategic missions through overseas locations.

Air Mobility Division (AMD)—One of five divisions of the AOC the AMD integrates and supports air mobility missions. They coordinate with the JFC, theater AMOCC (if established) and 618 TACC in planning, tasking and executing theater air mobility missions.

Air Reserve Component (ARC)—Refers to Air National Guard and AFRC forces, both Associate and Unit Equipped.

Air Route Traffic Control Center (ARTCC)—The principal facility exercising enroute control of aircraft operating under instrument flight rules within its area of jurisdiction. Approximately 26 such centers cover the U.S. and its possessions. Each has a communication capability to adjacent centers.

Air Traffic Control (ATC)—A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

Aircraft Commander (AC)—A qualified pilot graduate of an AC upgrade course or AC initial qualification training, certified by the squadron commander to act as PIC of an aircraft. Capable of holding the A-code.

Aircrew Chemical Biological Radiological Nuclear (ACBRN) Equipment—Individually fitted aircrew unique chemical protective equipment for the sole purpose of protecting aircrew while flying into and out of a CBRN environment.

Airfield Suitability and Restrictions Report (ASRR)—The ASRR and GDSS Airfield Database (AFD) products provide guidance and policy for AMC organic aircraft operations at airfields worldwide by means of individual suitability assessments (Giant Reports). Per AFI 11-202V3, other MAJCOMS and services establish specific guidance concerning applicability of the ASRR (and associated information) for their aircraft. The ASRR and AFD products are available to anyone with a GDSS account or on request from the AMC Airfield Suitability office (AMC/A3AS) at: **Airfield.Helpdesk@us.af.mil.**

Airlift—Aircraft is considered to be performing airlift when manifested passengers or cargo are carried.

Assault Landing Zone (ALZ)—A paved or semiprepared (unpaved) airfield used to conduct operations in an airfield environment similar to forward operating locations. ALZ runways are typically shorter and narrower than standard runways.

Augmented Crew—Basic aircrew supplemented by additional qualified aircrew members to permit in-flight rest periods.

BLUE BARK—US military personnel, US citizen civilian employees of the Department of Defense (DoD), and the dependents of both categories who travel in connection with the death of an immediate family member. It also applies to designated escorts for dependents of deceased military members. Furthermore, the term is used to designated property shipment of a deceased member.

Border Clearance—Those clearances and inspections required to comply with federal, state, and local agricultural, customs, immigration, and immunizations requirements.

Class I Route—Any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (NDB, VOR, TACAN) or intersection of at least two radio aid radials (VOR, TACAN) or one radial (VOR, TACAN) and one DME at least once each hour.

Class II Route—Any route that does not meet the requirements of a Class I route, including tactical navigation and overwater routes.

Charge Medical Technician (CMT)—A qualified AET who supervises other AETs in aircrew positions on an AE mission.

Circular Error Average (CEA)—Indicator of the accuracy of an airdrop operation. It is the radius of a circle within which half of the airdropped personnel and items or materiel have fallen.

COIN ASSIST—Nickname used to designate dependent spouses accompanying dependent children and dependent parents of military personnel reported missing or captured who may travel space available on military aircraft for humanitarian purposes on approval of the Chief of Staff, United States Army; Chief of Staff, United States Air Force; Chief of Naval Operations; or the Commandant of the Marine Corps.

Command and Control (C2)—The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. C2 functions are performed through an arrangement of personnel, equipment, communications, facilities, and

procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Command and Control Center (CC) (C2)—Each CC provides supervision, guidance, and control within its assigned AOR. For the purpose of this manual, CCs include operations centers, command posts, AMD, CRG, AMCC, and tanker task forces.

Computer ARA—An ARA flown on RVAD-equipped aircraft using RVAD procedures.

Contingency Fuel—Contingency fuel is an identified extra to compensate for unforeseen circumstances during any phase of flight (e.g., unforecasted weather, launch delay, etc.).

Contingency Mission—Mission operated in direct support of an OPORD, Operations Plan (OPLAN), disaster, or emergency.

Contingency Response Group (CRG)—Team of qualified Air Force personnel established to control, coordinate, and function as an Air Force tanker and airlift C2 facility at a base where normal AMC C2 facilities are not established or require augmentation. CRGs support and control contingency operations on both a planned and no-notice basis.

Crew Resource Management (CRM)—The effective use of all available resources--people, weapon systems, facilities, and equipment, and environment -- by individuals or crews to safely and efficiently accomplish an assigned mission or task.

Depressurization Fuel—The additional fuel required to protect the aircraft and occupants in the event of a cabin depressurization followed by an extended diversion to an alternate airport at low altitude where fuel consumption is increased.

Deviation—Actual takeoff time is not within -20/+14 minutes of scheduled takeoff time.

Direct Supervision—A crewmember is considered under direct supervision when flying with an instructor in the same crew position. For pilots, the IP will occupy one of the pilot seats. **(T-2)** For other crew positions, the instructor will be readily available to assume the primary duties if required. **(T-2)**

Direct Instructor Supervision—Supervision by an instructor of like specialty with immediate access to controls (for pilots, the instructor must occupy either the pilot or copilot seat). **(T-2)**

Director, Mobility Forces (DIRMOBFOR)—Normally a senior officer who is familiar with the AOR or joint operations area and possesses an extensive background in Air Mobility Operations. When established, the DIRMOBFOR serves as the designated agent for all air mobility issues in the AOR or joint operations area, and for other duties as directed. The DIRMOBFOR exercises coordinating authority between the AOC (or appropriate theater C2 node), the TACC, the Air Mobility Operations Control Center (when established and when supporting subordinate command objectives), and the Joint Movement Center, in order to expedite the resolution of air mobility issues. The DIRMOBFOR may be sourced from the theater's organizations or US Transportation Command. Additionally, the DIRMOBFOR, when designated, will ensure the effective integration of intertheater and intratheater air mobility operations, and facilitate the conduct of intratheater air mobility operations.

Double Blocking—When an aircraft is required to block-in at one parking spot, then move to normal parking for final block-in. The extra time required for double blocking will be taken into account during mission planning/scheduling. To compensate for double blocking on departure,

the aircrew "legal for alert time" may be adjusted to provide additional time from aircrew "show time" to departure. When double blocking is required on arrival, the aircrew's entry into crew rest will be delayed until postflight duties are complete.

Drop Zone—A specified area upon which airborne troops, equipment, or supplies are airdropped.

DZ Entry Point—A fixed point on DZ run-in course where an aircraft or formation of aircraft may safely begin descent from IFR enroute altitude to IMC drop altitude. The DZ entry point is a maximum of 40 NM prior to the DZ exit point according to Federal Aviation Administration FAR exemption 4371C. Formation descent will not begin until the last aircraft in formation is at or past the DZ entry point.

DZ Exit Point—A fixed point on the DZ escape flight path centerline, established during pre-mission planning, at which the formation will be at the minimum IFR enroute altitude. Calculate the exit point based upon three-engine performance at airdrop gross weight. This point will be planned no less than four NMs track distance beyond the DZ trailing edge. **(T-3)**

Electronic Flight Bag (EFB)—Any onboard computerized device used to perform functions such as viewing publications, displaying approach plates or calculating weight and balance.

Equal Time Point (ETP)—Point along a route at which an aircraft may either proceed to destination or first suitable airport or return to departure base or last suitable airport in the same amount of time based on all engines operating.

Execution—Command-level approval for initiation of a mission or portion thereof after due consideration of all pertinent factors. Execution authority is restricted to designated command authority.

First Suitable Airfield—The first suitable airfield available after completing the Class II route segment.

Fix—A position determined from terrestrial, electronic, or astronomical data.

Fuel Reserve—Amount of usable fuel that must be carried beyond that required to complete the flight as planned.

Global Decision Support System (GDSS)—AMC's primary execution C2 system. GDSS is used to manage the execution of AMC airlift and tanker missions.

Ground Time—Interval between engine shut down (or arrival in the blocks if engine shutdown is not scheduled) and next takeoff time.

Hazardous Cargo or Materials (HAZMAT)—Articles or substances that are capable of posing significant risk to health, safety, or property when transported by air and classified as explosive (class 1), compressed gas (class 2), flammable liquid (class 3), flammable solid (class 4), oxidizer and organic peroxide (class 5), poison and infectious substances (class 6), radioactive material (class 7), corrosive material (class 8), or miscellaneous dangerous goods (class 9). Classes may be subdivided into divisions to further identify hazard (e.g., 1.1, 2.3, 6.1, etc.).

IFR Drop Corridor—A corridor enabling an aircraft to operate below minimum IFR enroute altitude. It begins at the DZ entry point and ends at the DZ exit point.

IMC Letdown Corridor—A corridor enabling an aircraft to operate below minimum IFR enroute altitude. It begins at the letdown entry point and ends at the letdown exit point. It is constructed in the same manner as the IFR drop corridor, see AFTTP 3-3.C-130H for further details.

Improved Container Delivery System (ICDS)—Bundles utilize a 26-foot ring slot high-velocity parachute and wind drop sondes dropped before the cargo drop to get a more accurate in-flight CARP. ICDS are usually dropped only from high altitudes.

In-Place Time (IPT)—Time when an aircraft and crew are at an operating base and prepared to load for the mission.

Instructor Supervision—Supervision by an instructor of like specialty (see also Direct Instructor Supervision).

Integrated Flight Management (IFM)—The set of integrated C2 processes and supporting technologies producing seamless planning and execution of air mobility sorties.

Interfly—The exchange and/or substitution of aircrews and aircraft between Mobility Air Forces (MAF) including crewmembers and/or aircraft from AETC, ACC, Pacific Air Forces (PACAF), USAFE and AMC- gained ANG and AFRC forces.

Joint Airborne/Air Transportability Training (JA/ATT)—Continuation and proficiency combat airlift training conducted in support of DoD agencies. Includes aircraft load training and service school support. HQ AMC publishes JA/ATT tasking in AMC OPORD 17-76, annex C, appendix 1.

Joint Precision Airdrop Delivery System (JPADS)—Bundles/platforms which are GPS—guided and use wind dropsondes before the cargo drop to get a more accurate in-flight CARP. JPADS are usually dropped only from high altitudes.

Jumpmaster—The assigned airborne-qualified individual who controls parachutists from the time they enter the aircraft until they exit. Jumpmasters and safeties are not considered passengers for the duration of the flight even after personnel airdrops are complete.

Last Suitable Airfield (LSAF)—The last suitable airfield available before beginning the Class II route segment.

Lead Crew—A crew consisting of a lead certified AC and a lead certified navigator.

Local Training Mission—A mission scheduled to originate and terminate at home station (or an off-station training mission), generated for training or evaluation and executed at the local level.

Low Cost Low Altitude (LCLA)—A method to drop CDS bundles with improved accuracy and lower cost. Chute types range from disposable polypropylene parachutes to condemned personnel parachutes; the bundles are located on the ramp (either through drift-back or initial position) and manually cut by the LM at Green Light.

Maintenance Status—See Below

A-1—No maintenance required.

A—2— (Plus Noun): Minor maintenance required, but not serious enough to cause delay. Add nouns that identify the affected units or systems, e.g., hydraulic, ultra high frequency (UHF) radio, radar, engine, fuel control, generator, boom or drogue, etc. Attempt to describe the nature of the system malfunction to the extent that appropriate maintenance personnel will be available to meet

the aircraft. When possible, identify system as mission essential (ME) or mission contributing (MC).

A—3— (Plus Noun): Major maintenance. Delay is anticipated. Affected units or systems are to be identified as in A-2 status above.

A-4—Aircraft or system has suspected or known biological, chemical, or radiological contamination.

A-5—Aircraft or system has suspected or known battle damage.

Manual gate cut—LM using a knife to physically cut/release the CDS/intermediate gates.

Mission—Movement of aircraft from a designated point of origin to a designated destination as defined by assigned mission identifier, mission nickname, or both in the schedule, mission directive, OPORD, OPLAN, or FRAG order.

Mission Contributing (MC)—Any degraded component, system, or subsystem which is desired, but not essential to mission accomplishment.

Mission Essential (ME)—An degraded component, system, or subsystem which is essential for safe aircraft operation or mission completion.

Mission Essential Personnel (MEP)—Personnel who are required for the execution of the aircraft or unit mission, to include follow-on missions. See DAFMAN 11-401.

Mobility Air Force (MAF)—Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

Modified Contour—Flight in reference to base altitude above the terrain with momentary deviations above and below the base altitude for terrain depressions and obstructions to permit a smooth flight profile.

Most Probable Position (MPP)—A position determined with partial reference to a DR position and partial reference to all other fixing aids, weighing each one according to the navigator's judgment and experience.

Non-Visual Formation—Any formation where aircraft maintain position by means other than visual reference (e.g., SKE).

Off Station Training Flight—A training flight that originates or terminates at other than home station that is specifically generated to provide the aircrew experience in operating away from home station. Off station trainers will not be generated solely to transport passengers, cargo, or position/deposition crewmembers. **(T-3)**

Operational Control (OPCON)—Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects of military operations and joint training necessary to accomplish missions assigned to the command. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in

operational control considers necessary to accomplish the assigned missions. Operational control does not, in and of itself, include authoritative direction for logistical matters of administration, discipline, internal organization, or unit training.

Operational Missions—Missions executed at or above 618 AOC (TACC) or theater C2 agency level. Operational missions termed "CLOSE WATCH" include CORONET missions and priority 1, 2, and 3 missions tasked by the 618 TACC or theater C2 agency. Other operational missions such as deployment, re-deployment, reconnaissance operations, operational readiness inspections (ORI), AMC-directed channel or Special Assignment Airlift Mission (SAAM), and JA/ATT missions may be designated "CLOSE WATCH" as necessary.

Operational Risk Management (ORM)—A logic-based, common sense approach to making calculated decisions on human, materiel, and environmental factors before, during, and after Air Force operations. It enables commanders, functional managers and supervisors to maximize operational capabilities while minimizing risks by applying a simple, systematic process appropriate for all personnel and Air Force functions.

Originating Station—Base from which an aircraft starts on an assigned mission. May or may not be the home station of the aircraft. When aircraft is under change of operational control, deployed location is the originating station.

Over-water Flight—Any flight that exceeds power off gliding distance from land.

Pilot Flying (PF)—The pilot who is in direct maneuvering control of the aircraft.

Pilot In Command (PIC)—The AC, IP, or EP designated on the Flight Authorizations to act in command of a particular flight, or flights. Normally denoted by the A-code remark on the applicable Flight Authorizations.

Pilot Monitoring (PM)—The pilot at the flight controls who is not in direct maneuvering control of the aircraft, yet is primarily responsible to support the PF by actively monitoring the aircraft's current/projected flight path and energy state.

Positioning and De-Positioning Missions—Positioning missions are performed to relocate aircraft for the purpose of conducting a mission. De-positioning missions are made to return aircraft from bases at which missions have terminated.

Radar Verified Airdrop (RVAD)—A non-visual airdrop procedure utilizing radar updates; intended to perform aerial delivery missions in both visual meteorological conditions (VMC) and instrument meteorological conditions (IMC). This has replaced the procedures formerly known as AWADS.

Required Ramp Fuel Load (RRFL)—The minimum fuel required at engine start to complete the tasked mission.

Rush Baggage—Baggage or articles which have been misrouted or separated from the owner, and are to be forwarded to the owner.

Scheduled Return Date (SRD)—Allows air mobility units to predict when crews will return to home station. It allows force managers to plan aircrew availability and provide crews visibility over monthly flying activities. AMC and AMC-gained aircrews (except those on standby at home station) will have an SRT established on their flight orders. **(T-3)**

Scheduled Takeoff Time—Takeoff time established in the schedule or OPORD.

Special Tactics Team (STT)—A task-organized element of special tactics that may include combat control, pararescue, and special operations weather team (SOWT) personnel. Functions include austere airfield and landing zone reconnaissance, surveillance, establishment, and terminal control; terminal attack control; combat search and rescue; combat casualty care and evacuation staging; and tactical weather observations and forecasting.

618 Tanker Airlift Control Center (618 AOC)—Operations center that controls tanker and airlift forces worldwide through a network of computer systems. The 618 AOC, Tanker Airlift Control Center (TACC) is organized into geographic cells consisting of East, West, and Emergency Action Cells. The 618 AOC (TACC) contains the following functions: Mobility Management, Global Channel Operations, Operations Management, Current Operations, Global Readiness, Weather, Logistics Readiness Center, Aerial Port Control Center, International Clearances, and Flight Plans.

Tankered Fuel—Additional fuel carried through a primary destination for use on a subsequent leg.

Terminal Instrument Procedures (TERPS)—The criteria used to develop the procedures to safely fly on instruments in the terminal area of an airport.

Terminal Fuel Flow (TFF)—The fuel flow rate expected during the last hour at cruise altitude TFF is the fuel flow found on the last leg of a CFPS flight plan.

Training Mission—Mission executed at the unit level for the sole purpose of aircrew training for upgrade or proficiency. Does not include operational missions as defined in this manual.

Unilateral—Operations confined to a single service.

Unit Move—A mission airlifting military passengers or troops who originate from the same unit and onload point, are under the control of a designated troop commander and offload at the same destination.

Wing Relieving Fuel (WRF)—Additional Fuel kept in the main tanks intended to counter wing bending moments.

Zero Fuel Weight—Weight, expressed in lbs., of a loaded aircraft without fuel.